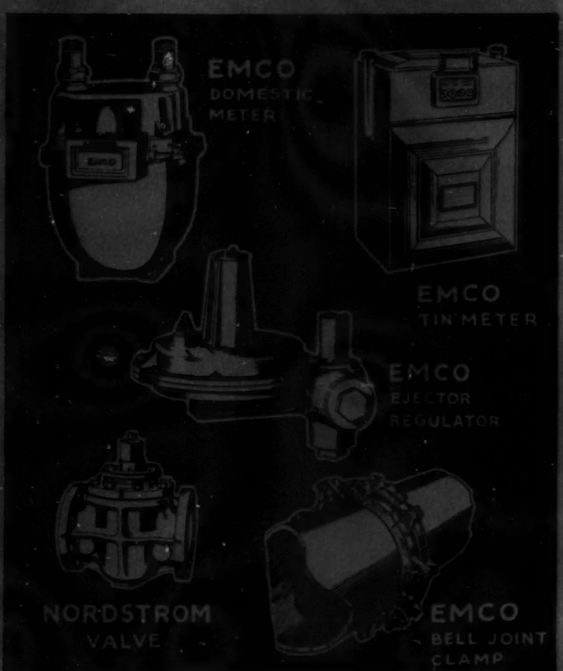
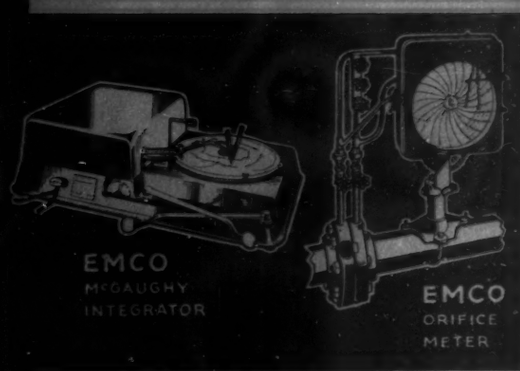
WESTERN GAS

EMCO METERS REGULATORS *and* ALLIED EQUIPMENT



NORDSTROM VALVES *with* PATENTED *"Sealdport"* LUBRICATION

A complete line of products for the measurement and control of Natural and Manufactured Gas. Each built for a specific purpose.



PITTSBURGH EQUITABLE METER CO.
MERCO NORDSTROM VALVE CO.

MAIN OFFICES PITTSBURGH, PA.

New York Columbia Chicago Memphis Kansas City Philadelphia Tulsa Houston Los Angeles Oakland

OVER HILL

AND PLAIN . . .

OR UNDER WATER

J&L PIPE

J & L STEEL LINE PIPE

The exceptional performance capacity of Jones & Laughlin Line Pipe has been proven again and again under widely varying and extremely difficult conditions. J&L Seamless has an enviable record in the exacting service of transporting oil, gas and gasoline. All J&L Line Pipe, both seamless and welded, can be depended on for durability and economy. You will find the J & L Pipe Catalog useful. . . . Write for a copy. Look to J&L for all your steel requirements, including standard pipe, boiler tubes, tin mill products and fabricated structural work.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

AMERICAN IRON AND STEEL WORKS

PITTSBURGH, PENNSYLVANIA

DRESSER

BUILDS A LEAK-PROOF PRODUCT FOR EVERY PIPE LINE PROBLEM

COUPLINGS AND LONG SLEEVES FOR NEW JOINTS ON ALL KINDS AND SIZES OF PLAIN END PIPE

CLAMPS FOR VARIOUS TYPES OF DEFECTIVE JOINTS ON EXISTING LINES

SPLIT SLEEVES FOR COMPLETELY ENCLOSING AND REPAIRING DEFECTIVE PIPE AND JOINTS ON EXISTING LINES

COUPLINGS AND LONG SLEEVES

STYLE 38 Steel Couplings make PERMANENTLY TIGHT, flexible connections between plain-end pipe sections, are quickly and easily installed by unskilled labor, are rubber gasketed, and absorb all normal pipe movements. Sizes: ⅜" I. D. to largest pipe diameter for all kinds of pipe.

STYLE 40 Long Sleeves serve the same purpose as Style 38's, but are installed on widely separated pipe ends. Sizes: ½" I. D. to 24" O. D. inclusive.

STYLE 53 Cast Couplings are like Style 38, except cast. Sizes: 4" to 30" inclusive.

STYLE 65 Compression Couplings have screw followers instead of bolts to compress the gaskets. Sizes: ⅜" I. D. to 2" I. D. incl.

CLAMPS

Dresser Clamps repair leaks in various types of pipe joints. They can be applied by unskilled labor without interruption of the service, give a permanently tight repair and are made by the world's largest and oldest builder of clamps.

STYLE 60 Bell Joint Clamps are adjustable, have a continuous gasket recess, and a sealing "pack" scientifically designed and PROVED. Sizes: 3" to 60" inclusive.

STYLE 41 (and 4) Collar Clamps prevent and repair leaks in screw collars (screw couplings). Sizes: ¾" I. D. to 12" I. D. inclusive.

STYLE 55 Porous Weld Clamps permanently repair porous but not broken welds. Sizes: 2" O. D. to 26" O. D. inclusive.

SPLIT REPAIR SLEEVES

Dresser Split Sleeves completely enclose and permanently repair breaks, splits, holes and defective joints of all types. They can be applied quickly, by unskilled labor, in any weather, under water, etc. All are rubber packed. Special styles of welded steel sleeves are built for unusual conditions or odd sizes.

STYLE 52-A Sleeves repair welds, screw collars, splits, holes, etc. Inside length: 8". Maximum working pressure: 500 lbs. per sq. in. Sizes: 4" I. D. to 26" O. D. inclusive.

Style 73 Sleeves are used for the same purpose as Style 52-A, except maximum working pressure is 250 lbs. per sq. in. Inside length: 8". Sizes: 2" I. D. to 12" I. D. inclusive.

STYLE 26 Sleeves repair broken bells on cast iron pipe. Maximum working pressure: 150 lbs. per sq. in. Sizes: 3" to 24" inclusive.

Style 57 Sleeves are identical with Style 73, except made for cast iron pipe sizes. Maximum working pressure: 250 lbs. per sq. in. Sizes: 3" to 12" inclusive.

Multiple Installations of two or more Style 57 or 73 Split Sleeves, for repairs longer than 8", can be made with simple joiner parts.

Style 54-A Sleeves repair leaking joints of the bolted coupling type on steel pipe. Maximum working pressure: 500 lbs. per sq. in. Sizes: 2" I. D. to 26" O. D. inclusive.

WRITE FOR FURTHER INFORMATION!

S. R. DRESSER MANUFACTURING COMPANY

BRADFORD, PA. (In Canada - DRESSER MFG. COMPANY, LTD., 32 Front St., W. Toronto, Ont.)

May, 1935. Volume XI, Number 5. Western Gas is published by Western Business Papers, Inc., at 810 South Spring Street, Los Angeles, California. Subscription price (in advance), 25 cents the copy; $2.00 per year; 2 years, $3.00; $3.00 per year foreign. Entered as second class matter June 1, 1925, at the postoffice at Los Angeles, under the Act of March 3, 1879.

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WESTERN GAS

"Reg. U. S. Pat. Off."

Publication Office: 810 South Spring Street, Los Angeles, Calif.
District Offices: 1064 Peoples Gas Building, Chicago; 447 Sutter Street, San Francisco

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Jay Jenkins, Publisher, George H. Finley, Editor, Craig Espy, Mid-Western Manager
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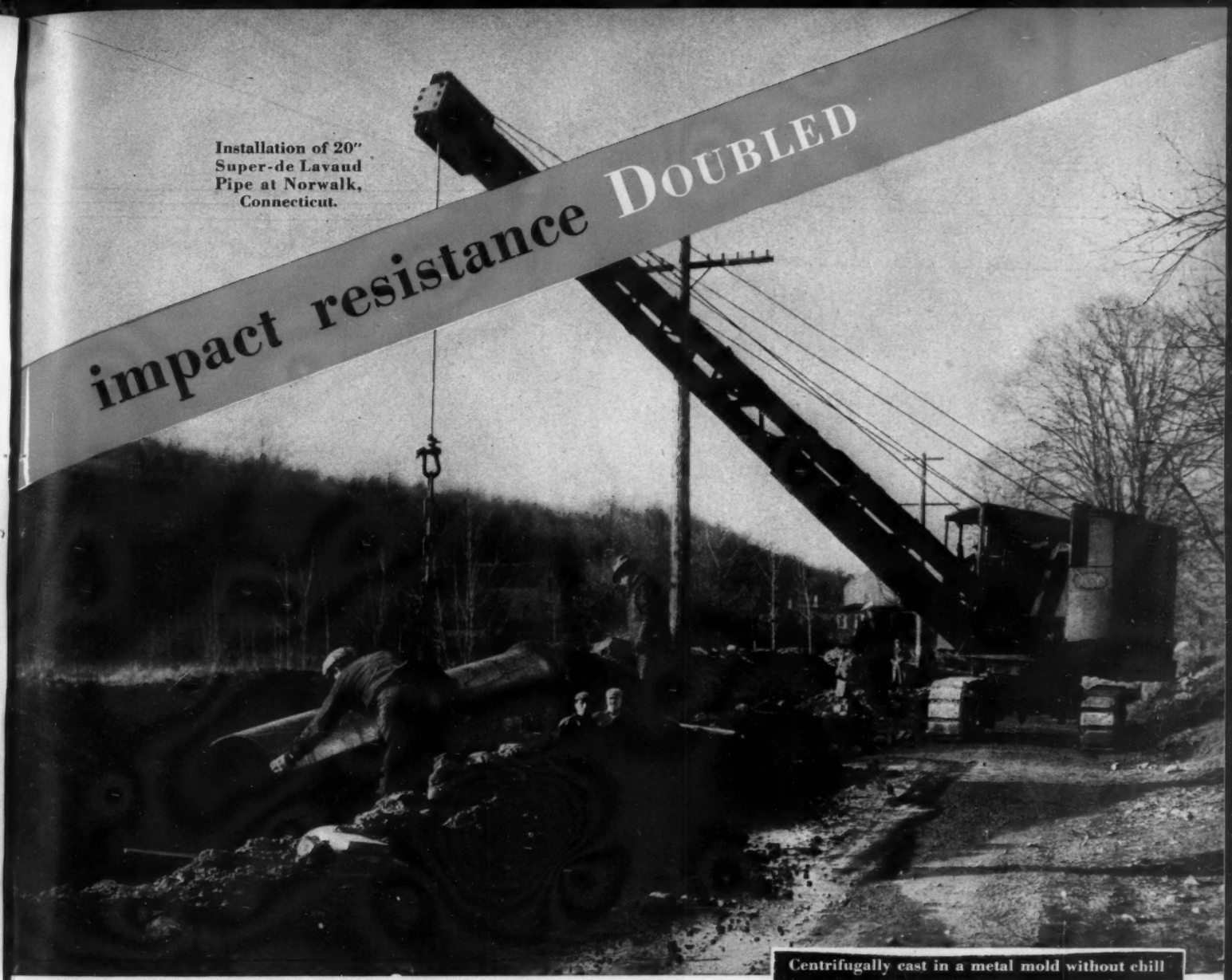
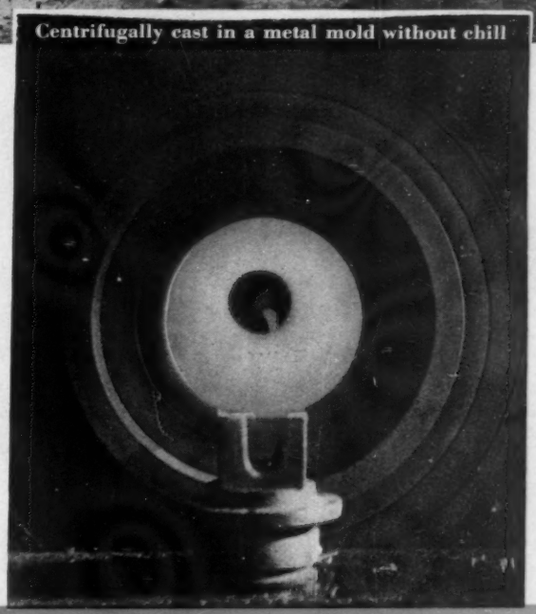


Installation of 20" Super-de Lavaud Pipe at Norwalk, Connecticut.

impact resistance DOUBLED

DOUBLED STRENGTH to resist impact shocks means that Super-de Lavaud Pipe offers these plus-values: super-service underground—and maximum protection from plant to underground. Two years ago that statement was based on exhaustive tests. Today it is confirmed by the experience of purchasers who have installed nearly *eight million feet.* Super-de Lavaud Pipe is the result of a patented process amounting to a basic discovery whereby gray iron is *centrifugally cast against metal without chill.* Ductility and toughness are increased, and impact resistance *more than doubled,* without reduction of tensile and bursting strength. We shall be glad to send you a booklet describing the Super-de Lavaud Process.



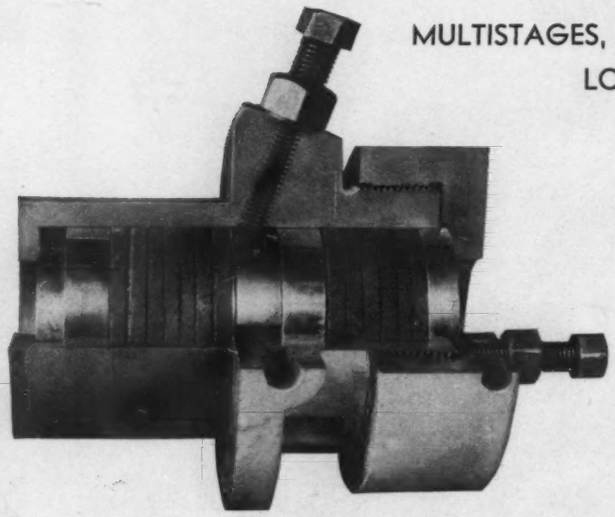
Centrifugally cast in a metal mold without chill

U.S. SUPER-de LAVAUD PIPE

CAST WITHOUT CHILL IN A METAL MOLD

UNITED STATES PIPE AND FOUNDRY CO., General Office: BURLINGTON, N. J.

Foundries and Sales Offices throughout the United States



MULTISTAGES, INTERNAL AND EXTERNAL LOCKED GLAND

The conventional stuffing-box may be adapted to receive this system of friction distribution. Special cages are also made, containing the adjustment mechanism.

The packing set is divided by a separator, which by external means may be fixed to the box wall. Adjustment provides even tension of the divided sets to automatically distribute the friction over the areas in contact.

Useful for extreme variable pressures, liquids, gases or vapors.

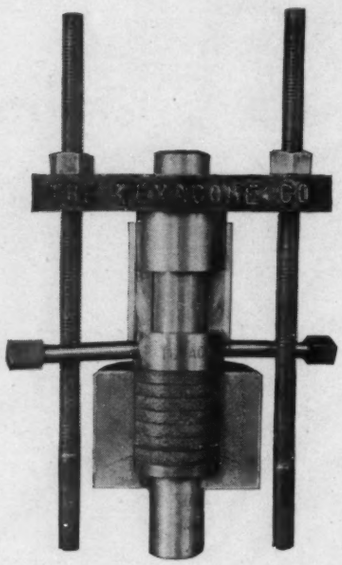
Packing *that will Stand High Pressure*

Built to *Your Own Specifications*

The elimination of leakage and the saving of wasted power has been made a special study by The Texacone Company, following discovery a number of years ago of a new basic method of making packing.

This method, now covered by many patents, enables The Texacone Company to meet most any packing problem incurred in the operation of a gas or natural gasoline system. It is especially adapted to high pressures and high temperatures.

INSTALLATION-AGAINST-PRESSURE SYSTEM



Gate valve stems, when repacked, frequently leak sufficiently to prevent easy insertion of any packing. The Texacone System of loading packing into a stuffing-box, despite leakage, consists of assembling the packing in a temporary stuffing-box, then forcing the packing into the box in perfect condition to hold any pressure. Means are provided to hold the packing in place while the special rigging is removed. The regular gland is then returned to position and permanently adjusted. Used principally on natural gas systems, cold gases and liquids.

The packing is made entirely through a system of folds, thus eliminating rubber, which hardens, and cement, which cracks. Texacone packing is not affected by acids found in so many waters throughout the West.

A number of established and successful firms are using this packing to the exclusion of all others, even though the initial cost is greater. Ask us to study your packing problem, or send us your specifications. We'll give you the name of someone you know who is using this packing so that you will feel safe in installing it for use at any pressure or temperature.

THE TEXACONE COMPANY

2007-9 West Commerce — P. O. Box 4186

DALLAS, TEXAS

•

PACIFIC COAST ADDRESS: L. J. JOHNSON, 1765 NORTH GOWER STREET, LOS ANGELES

1726 this pipe was laid -still in service 1935

This pipe was laid in Germany before the reign of Frederick the Great

THE cast iron water main shown above has served the German city of Ehrenbreitstein for more than two centuries. Over his official seal, the Burgomeister recently wrote, "The water main . . . was replaced in 1726 by cast iron pipes... crosses the much-frequented tramway . . . and lies partly under the provincial street to Arenberg with its heavy traffic. On the occasion of an excavation the enclosed photographs have been made . . . these show the position and the good condition of the pipes." Note that this pipe has bell-and-spigot joints. It is but one of many installations which demonstrate that the useful life of cast iron pipe is more than a century.

The four major economies resulting from the long life of cast iron pipe are due to its effective resistance to rust. Cast iron is the one ferrous metal for water and gas mains, and for sewer construction, that will not disintegrate from rust. This characteristic makes cast iron pipe the most practicable for underground mains since rust will not destroy it.

The 4 Economies of Cast Iron Pipe

1. Official records of cast iron pipe laid 100 to 200 years ago and still in service, prove that it is *cheapest in the end.*
2. Official reports on file in the office of a prominent technical publication, prove that cast iron pipe is *cheapest to maintain.*
3. Long-lived pipe obviously causes less street-opening for replacements and repairs. Therefore, cast iron pipe *saves money on street openings.*
4. When replaced by larger pipe, or a main is abandoned or rerouted, cast iron pipe *pays a final dividend in salvage value.*

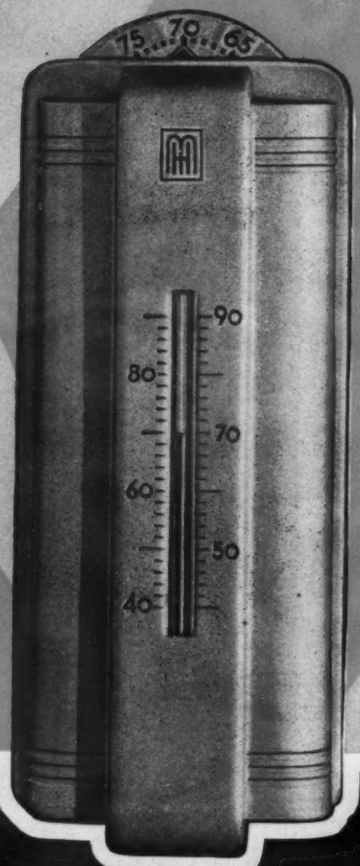
For further information, address The Cast Iron Pipe Research Association. Thomas F. Wolfe, Research Engineer, 1015 Peoples Gas Building, Chicago, Ill.

Photo by courtesy Deutscher Gussrohr-Verband G. m. b. H., Cologne

CAST IRON PIPE

METHODS OF EVALUATING BIDS NOW IN USE BY ENGINEERS RATE THE USEFUL LIFE OF CAST IRON PIPE AT 100 YEARS

ACRATHERM



ACTUAL SIZE

Designed by Henry Dreyfuss

New Beauty · Accuracy · Flexibility

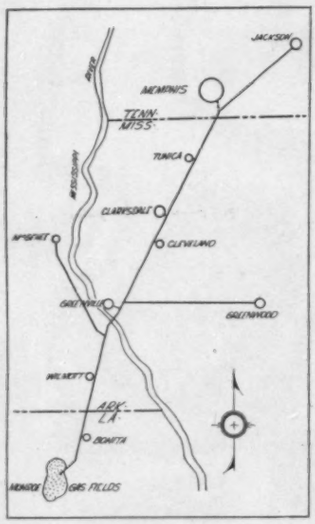
With the HEAT ACCELERATION PRINCIPLE

WITH justifiable pride, we present the new Minneapolis-Honeywell Acratherm, a plain pattern thermostat embodying the proved heat acceleration principle. This new instrument is the result of years of research, field tests and actual practical application . . . . Small in size, handsome and modern in design, the Acratherm is an entirely new instrument — inside as well as out. It is as accurate as its name implies, and this, together with its flexibility of application, produces new and matchless performance . . . . It is fitting that we present the Acratherm on the occasion of our 50th anniversary — fifty years of progress in automatic control . . . . A handsome brochure describing the Acratherm, together with a complete, technical informative book, is being distributed. If you do not receive your copies within the next few days, write Minneapolis-Honeywell Regulator Company, 401 East Twenty-eighth Street, Minneapolis, Minn. . . . Branch and distributing offices in principal cities. European sales and service, 233 Heerengracht, Amsterdam, Holland.

MINNEAPOLIS-HONEYWELL

Control Systems

It's Our Happy Privilege . . .
to Welcome You to The 1935 Natural Gas Convention



NATURAL GAS

Memphis Natural Gas Company pipes this fuel of economy through a 370 mile pipe line from the Monroe Gas Fields through Louisiana, Arkansas and Mississippi to the northern terminus at Jackson, Tennessee.

In helping to make Natural Gas available we are contributing daily to the progress and growth of the territory served.

MEMPHIS NATURAL GAS COMPANY
STERICK BUILDING MEMPHIS, TENNESSEE

Linked with Progress of this Community

Welcome to the
Convention of
Natural Gas Department
American Gas Association

May 6 to 9 - 1935
Hotel Peabody
Memphis, Tennessee

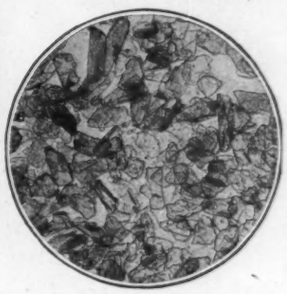
This company renders services that are vital to the welfare of the people of the community. . . Its officers and directors count the institution as a part of the civic and commercial life of the community, and are always interested in every worthy enterprise. . . Throughout the years we have been linked with every progressive step for the advancement of community welfare.

MEMPHIS POWER & LIGHT COMPANY

Pipe line protection
cuts annual costs

The efficiency of any pipe line coating is measured by its resistance to water and soil acids, to soil stresses, to electrolysis and to the corrosive effects of submersion. Without these qualities it cannot be truly economical. Barrett Pipe Line Enamels are designed to satisfy all requirements—to assure effective protection at low annual cost. Experienced Barrett technical men will gladly work with you, combining their special knowledge and experience with your familiarity with conditions along the right of way, to provide the maximum protection for every dollar spent. Phone, wire or write.

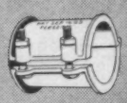
THE BARRETT COMPANY, 40 RECTOR ST., NEW YORK, N. Y.



Reproduction of the micrograph above shows the interlocking of the flakes of the internal reinforcement used by Barrett. By laminating with the waterproofing agent they give Barrett Pipe Line Enamels unusual toughness and resistance to soil stresses.

For pipe of large diameter, The Barrett Company will furnish equipment required to revolve pipe and spread enamel.

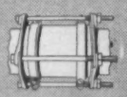
SKINNER



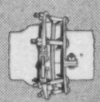
EMERGENCY PIPE CLAMP

PIPE LINE CLAMP

PIPE JOINT CLAMP

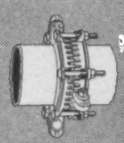


COLLAR LEAK CLAMP



BELL JOINT CLAMP

SPLIT COUPLING CLAMP



HIGH PRESSURE WELD CLAMP

SERVICE SADDLE

PRESSED STEEL ECONOMY CLAMP

A CLAMP FOR EVERY LEAK

PRESSED STEEL ECONOMY CLAMP

● The Skinner Pressed Steel Economy Clamp is made of full 3/16″ hot pressed steel plate, with sturdy wedge shaped lugs pressed out of the material itself. Full takeup pressure is applied directly to gasket.

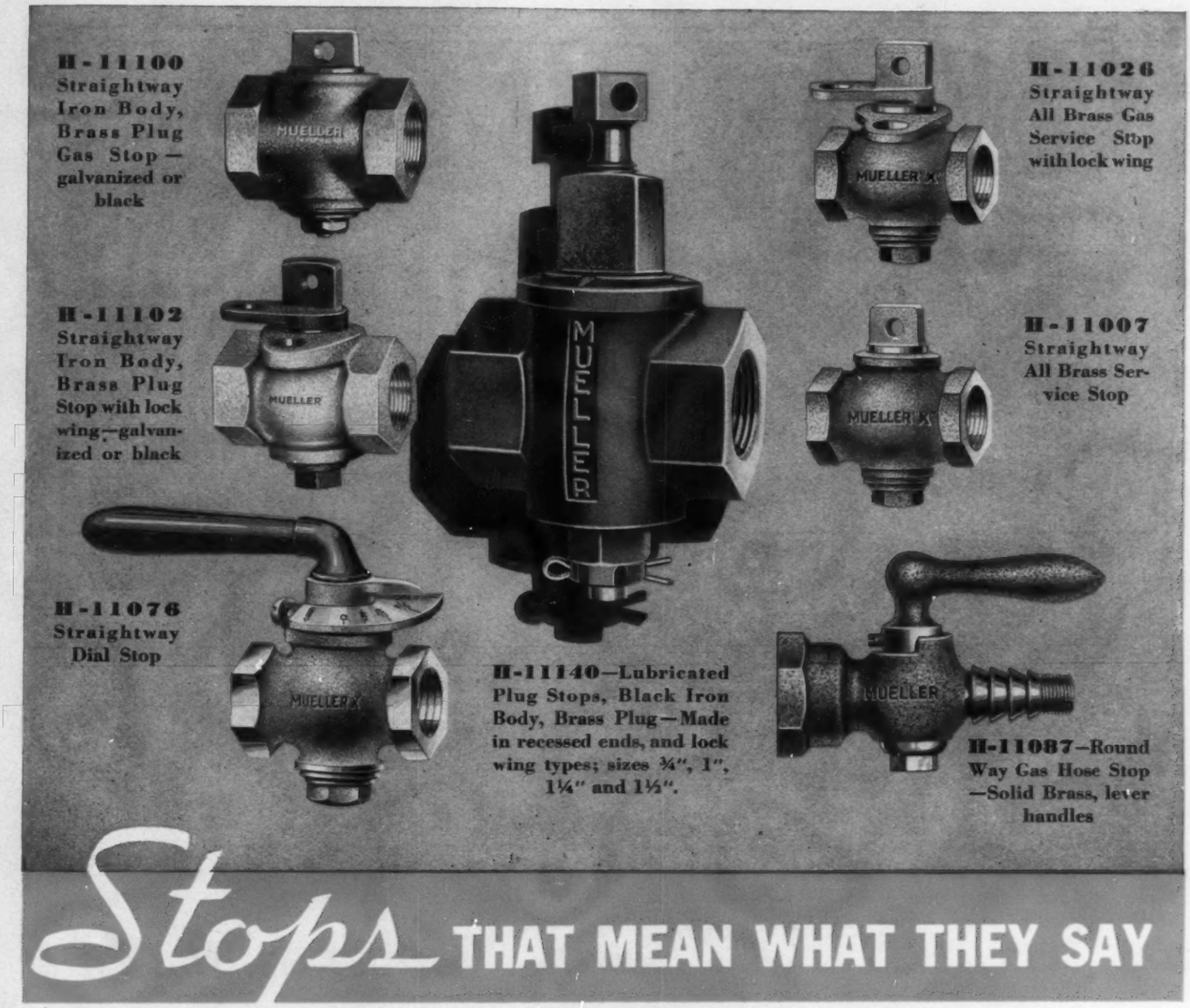
● Stops the leak instantly and permanently. Later, if desired, the half of clamp which covers the leak can be welded on as a patch—the other half used again.

● Not a makeshift, but a factory precision clamp at less than homemade cost. Comes in two widths—3½″ wide with single bolt and rubber cone gasket *for repairing pit holes in pipe lines.* 6½″ wide with two bolts and pressure-equalizing strip gasket of soft tire stock, *for running corrosion spots.* (See bottom illustration in border at left.) Clamps are enamelled, with cadmium plated steel bolts for pipe sizes from 6″ to 24″. Write for discounts and complete catalog.

M. B. SKINNER COMPANY

Manufacturers and Engineers • Est. 1898

SOUTH BEND • • INDIANA


H-11100
Straightway Iron Body, Brass Plug Gas Stop—galvanized or black
H-11026
Straightway All Brass Gas Service Stop with lock wing
H-11102
Straightway Iron Body, Brass Plug Stop with lock wing—galvanized or black
H-11007
Straightway All Brass Service Stop
H-11076
Straightway Dial Stop
H-11140—Lubricated Plug Stops, Black Iron Body, Brass Plug—Made in recessed ends, and lock wing types; sizes ¾", 1", 1¼" and 1½".
H-11087—Round Way Gas Hose Stop—Solid Brass, lever handles
MUELLER

Stops THAT MEAN WHAT THEY SAY

Of all equipment made in Mueller plants, nothing is so simple in form as ground plug stops—or so difficult to manufacture! To manufacture stops that mean what they say, even when subjected to the high air pressure tests submerged in liquid, calls for a degree of precision that is found in few manufactured products.

As one of the oldest and largest manufacturers of this class of equipment, Mueller Company has developed elaborate facilities for achieving this precision that means so much to your business and our business. The methods include laboratory control of materials, special machinery for machining plugs and grinding them into the bodies—to mirror smoothness and microscopic contact throughout the entire tapered section.

This care is reflected in the record of Mueller Brass Goods. It explains why *all* Mueller Stops work right year in and year out—under all service conditions.

A number of typical Gas Stops are illustrated above—but they are only a small part of the wide range of types and patterns illustrated in Section 3 of your Mueller Gas Catalog H.

MUELLER CO., Decatur, Ill.

***Factories:* Decatur, Ill., Chattanooga, Tenn., Los Angeles, Calif., Sarnia, Ont.**
***Branches:* New York and San Francisco**

MUELLER

GAS DISTRIBUTION EQUIPMENT

Gas Stops
Service Stops
Lock Wing
Meter Stops
Angle Union
Stove Stops
Dial or Indicator Stops
Hose Stops
Lubricated Plug Stops

HOW? *By using Copper Tubes for small mains and services.* WHY? *Because Copper cannot rust!*

FOR small mains and services, Anaconda Deoxidized Copper Tubes frequently effect worthwhile savings. Particularly is this true where the soil is corrosive . . . as the rate of corrosion on copper is only about one-tenth as rapid as on rustable metals. In other words, copper lasts ten times longer!

This greater durability of copper makes possible a substantial reduction in the annual cost for material and maintenance, which in a few years compensates for the slightly higher original cost of copper. Conversely, the first repair job of any consequence to rustable lines costs far more than the original saving—and clearly reveals the economy of a copper tube installation.

Sizes and weights of Anaconda Copper Tubes—Type K

Nominal Size	*O. D In.*	*I. D. In.*	*Wall In.*	*Lbs. Per Ft.*
⅜″	.500	.402	.049	.269
½″	.625	.527	.049	.344
¾″	.875	.745	.065	.641
1″	1.125	.995	.065	.839
1¼″	1.375	1.245	.065	1.04
1½″	1.625	1.481	.072	1.36
2″	2.125	1.959	.083	2.06

For use with Anaconda Deoxidized Copper Tubes in underground service, The American Brass Company offers a full line of wrought copper "solder" fittings, as well as cast bronze fittings—both "solder" and "flared tube" types. All are supplied in elbows, tees, unions, couplings and adapter fittings. Relatively inexpensive, and light in weight, these fittings are precision-made to assure tight connections and an unrestricted flow. They are stocked by leading distributors of Anaconda Copper Tubes which, for underground use, are recommended in the Type "K" wall thicknesses shown in table at left.

In these products . . . as in all others that bear the Anaconda trade-mark . . . every precaution is taken to assure uniform, dependable quality.

THE AMERICAN BRASS COMPANY

ANACONDA

General Offices: Waterbury, Connecticut

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WESTERN GAS

Vol. XI, No. 5

"Reg. U. S. Pat. Off."

A Monthly Journal of the Gas and Gas Appliance Industries in *Western America*

10 YEARS with "Western Gas"

HAVING reached the end of its first decade of publication service to the gas industry *Western Gas* in this 10th Anniversary Edition pauses briefly in review. Succeeding pages present in some detail a chronicle of the industry's 10-year progress, but on this single page we propose with the readers' indulgence to comment upon the changes which these 10 years have brought to *Western Gas*.

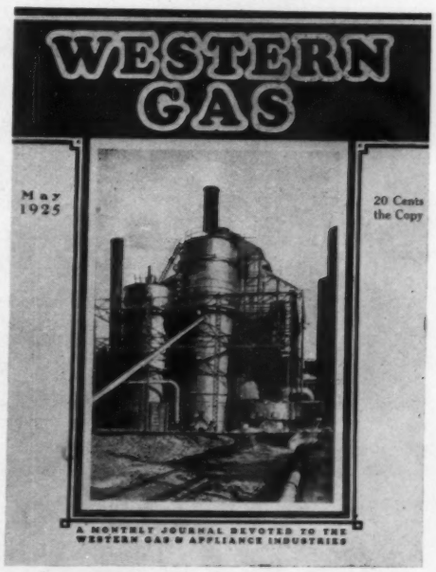
In May, 1925 the publishers brought from the press, in Los Angeles, Calif., Vol. 1, No. 1 of *Western Gas*—an experiment, made at a time when Western printing houses were full of new industrial magazines, most of them destined for early oblivion. That *Western Gas* has found a more permanent place is evidence that its mission was a serviceable one to the gas companies of its circulation area.

In this foreword to the 10th Anniversary Edition the publishers wish to acknowledge again with deep gratitude the help and encouragement which have come from many sources, and which, more than other factors, have accounted for the publication's continuance.

The Pacific Coast Gas Association, for which *Western Gas* from its first year has served as official publication, through its officers and membership has extended unceasing cooperation. To E. L. Hall, president of the Association at the time of the magazine's launching, and to Clifford Johnstone, then secretary and now managing director, the publishers feel a special debt which also extends to the succeeding P.C.G.A. administrations.

In its early editorial service *Western Gas* drew heavily upon the counsel of an advisory board, made up of C. B. Babcock, H. R. Basford, Harry J. Bauer, O. C. Bunster, H. M. Crawford, Addison B. Day, E. L. Hall, H. W. Jackson, Clifford Johnstone, Wm. Kapus, L. M. Klauber, R. G. Logue, Wm. Moeller, Jr., Frank L. Pollard, Geo. Wehrle and Geo. E. Whitwell. With very few exceptions these men are represented in this issue in a series of statements on the industry's outlook, beginning on Page 22.

Through the years the publication's advertisers have extended the most tangible sort of encouragement. We have found interest in consulting the Advertisers' Index of the first issue, May, 1925, which carried these company names: Bartlett Hayward Co., C. B. Babcock Co., Beacon Light Co., C. F. Braun & Co., Chaplin-Fulton Mfg. Co., Cleveland Gas Burner Co., General Gas Light Co., Lattimer-Stevens Co., Merco Nordstrom Valve Co., W. E. Mushet Co., Oliver Continuous Filter Co., Pacific Gas Radiator Co., Pacific Gas and Electric Co., Pacific Meter Works, Pittsburgh Meter Co., Reliance Manufacturing Co., Reynolds Gas Regulator Co., Geo. D. Roper Corp., Safety Gas Main Stopper Co., S. B. Sexton Stove Co., Southern Counties Gas Co., Sprague Meter Company, Stockton Fire Brick Co., United States Cast Iron Pipe and Foundry Co. Of these 24 companies a majority will be found in the present issue of May, 1935, which carries the advertising of 66 firms.



A reproduction of front cover from Volume I, Number 1.

Editorial contributors make up another large group among those whose efforts have accounted for the magazine's growth and service. It is a matter of pride with the publishers that so large a portion of the month-to-month editorial contents have come directly from men in the industry.

Western Gas' outlook has grown with the changes in the industry during the 1925-1935 period. At the outset it aspired to serve only the 11 states of the Far West. It soon became apparent that Pacific Coast problems were duplicated in the Southwest and Midwest as natural gas service became more universal in these areas. A Southwest office was opened early in 1928, and though Pacific Coast coverage has been in no way lessened, the magazine's readers in all sections have benefited as a result of the broader area covered. The present Chicago office, opened in 1934, is a vantage point from which the developments of this important area may be recorded.

Much of the development in the whole area west of the Mississippi—to which *Western Gas* restricted its coverage prior to 1929—centered about natural gas service. This was reflected in the editorial character of the magazine and placed it in demand in all natural gas sections. As natural gas penetrated the Southern states and other sections, *Western Gas* made it a point to follow, and the result has been a gradually developing national coverage which has strengthened with the years.

10 YEARS in Review

a rapid glance at gas industry progress and problems over the decade 1925-1935—by geographical areas

IN connection with this 10th Anniversary Edition of *Western Gas* there is here presented a review, arranged by important areas, of the 1925-1935 period in the gas industry. Separate chapters are contributed to the account by four authors—Clifford Johnstone, Geo. Wehrle, P. McDonald Biddison, and Craig Espy—resulting in a diversified view of the principal developments in this fast-moving decade.

Change and expansion have been the order of the day over these past 10 years, making it apparent that the most stable of industries, gas service, is yet a dynamic industry, quite capable of adjusting itself to new conditions and new opportunities.

Gas men have broken new ground in the past decade. New capital has gone into service facilities in unbelievable amount, to finance the long distance transmission of natural gas and the changes called for in local distribution systems to accommodate the new fuel.

While much of the progress has centered about natural gas, the industry has pioneered in other directions as well. A new technique has been developing in sales departments, for example, to meet the shifting economic and competitive conditions. Where in 1925 many new business departments were that in name only, now mass selling, long-term financing, and use of non-sales employees in business-building are customary procedures. Where appliance dealers were left to their own resources in sales development, now every inducement and help is extended them to actively share in the appliance market. Cooperative advertising has been engaged in successfully for the first time in several sections, both by associations and by cooperating individual companies.

Within the decade under review the liquefied petroleum gas industry has taken on important proportions; bottled gas customers have popularized gas in sections off the gas main, and central plants using these fuels have brought city gas convenience for the first time to scores of communities.

These and other developments of lesser importance make up the gas progress story which it has been *Western Gas'* privilege to chronicle during the 10 years just ended.—*Editor.*

. . . on the Pacific Coast

By CLIFFORD JOHNSTONE
Managing Director, Pacific Coast Gas Association

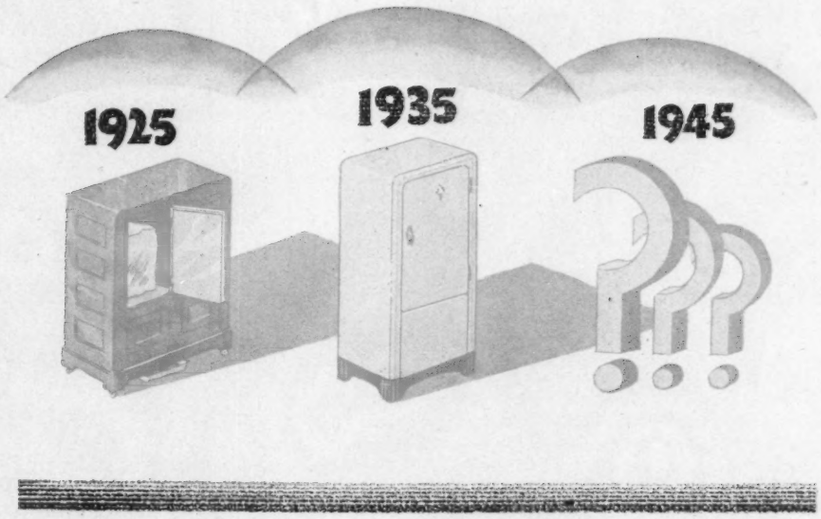
TEN years is a short time in the life of the gas industry and only one-seventh of the normal life span of a man. Yet a great deal can happen in 10 years, and a great deal has happened in the Pacific Coast gas industry since May, 1925, when Jay Jenkins and George Finley published the first issue of *Western Gas.*

The leading article in that issue called attention, with pardonable pride, to the fact that the 55 companies making up the Pacific Coast gas industry had an investment of some 200 million dollars in facilities to serve 1¼ million homes in 375 cities, towns and villages. It said that nearly 100 billion cubic feet of gas had been sold in 1924 yielding a gross revenue of 60 million dollars. Now 10 years later, consolidations and mergers have reduced the number of companies to less than 40 with an investment of close to 300 million dollars. The homes and businesses served now number more than 1⅔ million in 675 communities. Sales in 1934 were more than 150 billion cubic feet, most of which was natural gas instead of the manufactured gas of half its heating value sold in 1924.

The most significant change during the period was the discovery of new commercial sources of natural gas and their prompt utilization by gas operating companies. In 1925 California was still largely on a manufactured gas basis. Natural gas was being used in many localities in Southern California but the sources of supply were not adequate to permit straight natural gas service to domestic customers in Los Angeles. The greater part of Los Angeles was supplied with mixed natural gas and "reformed" gas, while in other parts of the state oil gas was made. Gas engineers were much concerned over the mounting price of oil and its poorer and poorer quality due to the increased efficiency of cracking processes. Investigations were being made of the feasibility of using coal for gas-making and in 1926 the Pacific Gas and Electric Co. built a water gas plant in Marysville using Utah coal, and decreased its manufacturing costs thereby. These water gas generators used the "back-run" process developed in 1924 by D. J. Young and G. E. Whitwell as the result of experiments at Everett and Tacoma, Wash.

However, nature and the enterprise of the oil explorers solved the problem. Natural gas production increased gradually from 1926 on, through the discovery of new fields and new sands in old fields, reaching a peak in 1929 following the discovery of deep sands in Los Angeles basin fields and the Buttonwillow and Kettleman Hills fields in the San Joaquin Valley. There followed a period of tremendous wastage of gas, finally brought under control by the state in cooperation with the oil producers. Los Angeles was put on a straight natural gas basis early in 1927, Santa Barbara in 1928, the San Francisco Bay District in 1929, and San Diego in 1932. Other extensions, notably the Stanpac line, the Southern California Gas Co.'s line to Fresno, and the Santa Maria Gas Co.'s line to Paso Robles have carried natural gas to all but a few outlying communities in the state. The cubic feet of gas manufactured in California during 1934 constituted less than ½ of 1 per cent of the natural gas purchased by gas companies.

In the meantime two widely separated districts were receiving natural gas service. In 1931 the Western Gas Co. built a line into Arizona from the east to serve Douglas and Bisbee. In 1933 this line was extended to Tucson and Phoenix, the two largest cities in the state. Also in 1931 the Montana Power Co. built a line from the Cutbank field in Northern Montana into Butte, Helena and Anaconda, and a second line



from Wyoming into Livingston and Bozeman.

One other natural gas development deserves comment. In 1929 the Northwestern Natural Gas Co. was formed to pipe gas from a number of shallow wells in the Rattlesnake Hills in Southern Washington to nearby towns. The gas supply has never been entirely adequate and in spite of continued exploration no natural gas in commercial quantities has yet been discovered in Oregon or Washington.

GAS COMPANY CHANGES

As indicated by the reduction in the number of operating companies mentioned earlier in this article, there have been many changes in the roster of gas companies. Most of these changes have been the outcome of the purchase of small, poorly financed companies by larger companies with the result that rates were decreased and service vastly improved. The old Twin Cities Gas Co. at Beaumont, Southwestern Gas Co. at Hemet, and Elsinore Gas Works at Elsinore are now a part of the Southern California Gas Co. system, as are a number of former small enterprises in the San Joaquin Valley, i.e., Producers Gas & Fuel Co., Valley Natural Gas Co., Hanford Gas & Power Co., Central Counties Gas Co., and Riverbend Gas and Water Co. In 1927 the Midway Gas Co., pioneer in the California natural gas business, was merged with the Southern. In 1925 the Southern Counties Gas Co., in 1928 the Santa Maria Gas Co., and in 1929 the Southern California Gas Co. became part of the Pacific Lighting Corp. system, the resulting inter-connections and extensions vastly improving gas service in Southern California.

The Madera Gas Co. and the Fowler Gas Co. are now a part of the system of the San Joaquin Light and Power Corp., and the Turlock, Modesto and Tracy gas companies have been taken over by Pacific Gas and Electric Co., as has the Western States Gas and Electric Co. which in 1925 was serving gas in Stockton and Eureka. The Sacramento Gas Co. serving Lodi and a small part of Sacramento, and the Coast Valleys Gas and Electric Co. in Salinas and Monterey, have also been purchased by Pacific Gas and Electric Co.

In Oregon the gas properties which in 1925 were owned by the Pacific Power and Light Co., and the Mountain States Power Co. are now part of the system of the Northwest Cities Gas Co. which also owns the former Pacific Power and Light Co., plants in Washington and Idaho. The old Portland Electric Power Co. plant in Salem, Ore., is now a link in the system of Portland Gas and Coke Co. which was extended south to Albany and Corvallis in 1930. What in 1925 were known as the Olympia Gas Co., the Tacoma Gas & Fuel Co., the North Pacific Public Service Co., and the Puget Sound Gas Co., are now welded together into the Washington Gas and Electric Co. The British Columbia Electric Railway Co. extended its gas service through the purchase of the New Westminister Gas Co.

In Arizona the Bisbee Improvement Co., the Douglas Gas Corp., the Globe Light and Power Co., and the Yuma Gas, Light and Water Co. have become the Arizona Edison Co.

The extension of gas service on the Pacific Coast during the past 10 years has been for the most part accomplished by the growth of existing companies. One notable exception was the result of the efforts of oil companies to create a market for the new product, butane. The only company to attack this problem in a really big way was the Standard Oil Co. of California which through subsidiaries built some 19 butane-air plants in California, Oregon and Washington. The field was new and untried and before the plants could be completed the depression was in full flower. As a result the venture was far from profitable, but nevertheless a number of small cities and towns are receiving splendid gas service. The majority of Oregon and Washington properties are now owned and operated by local interests. The California plants have been consolidated into the Natural Gas Corp. of California, still a subsidiary of Pacific Public Service and the Standard Oil Co. The old Westside Natural Gas Co. is merged with this company.

In 1926 the South Coast Gas Co. was formed to build a gas plant at Oceanside. This plant is now shut down and Oceanside is served with natural gas by the San Diego Consolidated Gas and Electric Co. In 1931 the Western Gas Co. of Washington put new water gas plants at Longview and Bremerton into service.

BUTANE PLANTS

A number of other companies were formed to build isolated butane plants, notably the Southwest Gas Corp. with plants in Barstow and Victorville, Calif.; the Arizona Gas Co., Winslow, Ariz.;

VITAL STATISTICS OF PACIFIC COAST GAS COMPANY OPERATIONS

Year	Active Meters	Sales-M c.f.	Gross Revenue
1924	1,113,609	89,095,851	$49,805,976
1925	1,202,906	95,602,424	$53,630,444
1926	1,376,324	98,937,964	$61,089,603
1927	1,449,400	99,183,238	$68,765,735
1929	1,583,572	135,138,314	$77,912,466
1930	1,620,561	131,920,987	$75,107,512
1931	1,637,265	148,703,513	$75,194,877
1932	1,602,760	124,625,058	$73,471 715
1933	1,613,066	135,549,674	$74,061,947
1934	1,655,759	152,806,070	$72,011,710

NOTE: The above figures are strictly comparable for the years 1929 to 1934. The years 1926 and 1927 are comparable with each other but omit a few small companies included in later years. The years 1924 and 1925 include figures from 20 gas companies, 7 less than included in 1926.

the Southeastern Service Co., Indio, Calif.; and Nevada Gas Co., Las Vegas, Nev.

The gas industry has made marvelous progress during the past 10 years. The photographs of gas appliance displays appearing in 1925 issues of *Western Gas* reveal in a startling manner the vast improvement that manufacturers have achieved in beautifying gas ranges. The insulated oven, automatic top burner lighters, oven lighters, drawer type broilers and clock controls have all been developed during the period. Modern gas house heating, pioneered on the Pacific Coast, has spread throughout the nation and we are now on the threshold of all-year-round air-conditioning in which gas will take a leading part.

The very first issue of *Western Gas* published in May, 1925, announced the departure of R. M. Conner from Portland, Ore., to assume the direction of the Appliance Testing Laboratory of the American Gas Association. This laboratory has been of inestimable value to the industry and the Pacific Coast is proud of the part it has taken in its inception and support, and also of the fact that its first and only branch was established in Los Angeles in 1931.

Since 1925 the Pacific Coast has been visited by two major earthquakes, one at Santa Barbara in 1925 and one at Long Beach in 1933. In both cases gas service was expertly handled and did not become a factor in increasing the fire hazard or in causing loss of life. Pacific Coast gas companies have contributed many notable improvements to gas technology among which may be mentioned perfection of high pressure distribution, high pressure storage and the development of the by-product sulphur method of liquid purification. The Proceedings of the Pacific Coast Gas Association record many other achievements in research and methods now standard practice throughout the industry. In addition to the annual Proceedings, the Association has contributed a number of publications to the literature of the industry, each one a pioneer in its field. Among these are the Gas Appliance Testing Code published in 1924, the Gas Appliance Installation and Service Manual in 1926, the Data Book on Gas Fuel in 1931, and the Gas Engineers Handbook in 1934. *Western Gas,* itself is an achievement upon which the Pacific Coast prides itself. Conceived and encouraged by the Pacific Coast Gas Association, but entirely independent financially and editorially, it has rendered 10 years of constructive and loyal service to the industry.

One other notable accomplishment is the cooperative load-building advertising program now in its seventh year on the Pacific Coast. It has done a great deal to popularize the use of gas, to encourage retail dealers of gas appliances and to cement cordial relations between all elements of the industry.

All in all it has been an interesting 10 years; six years of rapid growth and expansion, tapering off into four years of consolidation during depression—10 years in which much has been accomplished and containing but little to regret.

10 YEARS in Mountain Area

By GEO. WEHRLE
Superintendent Gas Department
Public Service Company of Colorado

JUST 10 years ago, this writer was working on plans for the construction of a new gas-manufacturing plant in Denver which was expected to embody the last word in modern gas-production design. This plant was described in a paper entitled "Approaching the Ideal Gas Manufacturing Process," presented at the Pacific Coast Gas Association meeting in September, 1926* In July 1928, less than two years later, *Western Gas* published an article entitled "Natural Gas for Denver," fully describing the project of supplying Denver with natural gas from the Texas Panhandle which had just been completed.

*Editor's Note: Mr. Wehrle's paper appeared in *Western Gas* for September, 1926.

DENVER LINE MADE HISTORY

The 340-mile gas pipeline to Denver made history since it was at the time of construction the longest gas line installed to supply a principal market. It was, in fact, the first of a number of long gas lines built in the decade under discussion employing new features in their design and construction which made possible the transportation of natural gas to markets formerly considered beyond the reach of economical delivery.

In 1925, the Mountain Area had seen only a small amount of natural gas development and that was chiefly in Wyoming. A small gas field had been developed in northern Colorado and natural gas was substituted for manufactured gas in Fort Collins, Colorado, and Cheyenne, Wyoming, in 1925 and 1926. No large-scale developments were in prospect until 1926 and 1927 when active efforts were begun to make natural gas available for Denver from the Texas field and for Salt Lake City from the Baxter Basin and other fields in Wyoming. The line from Texas was completed in the spring of 1928 and at this

time extends into Wyoming, supplying practically all of the principal cities of Colorado and Cheyenne, Wyoming. The Salt Lake line was completed in 1929 and supplies all of the territory adjacent to Salt Lake. Natural gas was piped from San Juan Basin in southern Colorado and northern New Mexico to Santa Fe and Albuquerque, New Mexico, and to Durango, Colorado, in 1930. A pipeline was also laid in the same year from the Cut Bank field in northern Montana to supply Butte and Helena, Montana, and the districts adjacent thereto.

Additional gas developments all over the state of Wyoming were made in recent years and all of the principal cities and towns of that state are now supplied with natural gas. In Montana, the cities of Great Falls and Missoula are supplied from the Sunburst Field, Billings from the Elk Basin Field, and Miles City from the Cedar Creek Field, all within the state. Roswell and Carlsbad, New Mexico, are supplied with natural gas from the Southeast New Mexico Field, Deming from the Hobbs Field, Tucumcari and Clovis from the Amarillo Field in Texas, and Clayton is supplied from the Amarillo-Denver pipeline. The Uinta pipeline, supplying Salt Lake City and other Utah cities, has been extended into Idaho to supply a principal market at Pocatello. Natural gas has been piped from the Hugoton Field in Kansas to Lamar and Springfield, Colorado, and a local gas field is supplying the city of Craig, Colorado, on the Western Slope.

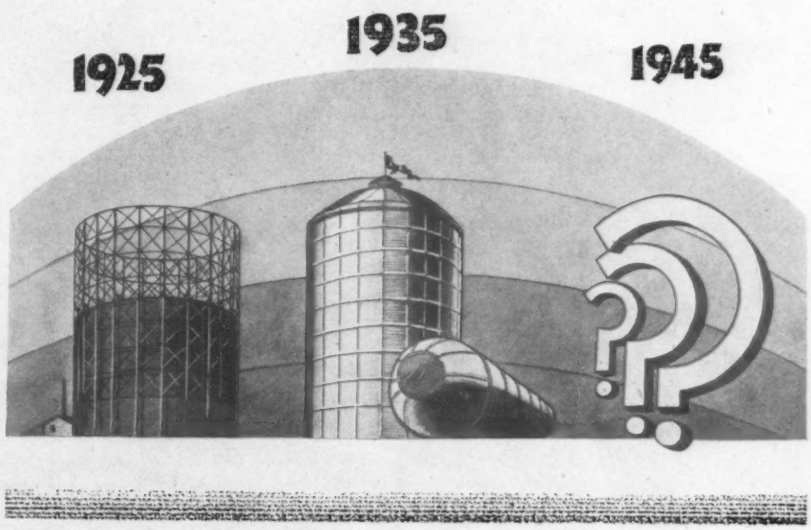
In the vast Mountain Area, containing 556,483 square miles and with a population of 2,750,000, there remain in 1935 only four gas-manufacturing plants supplying 3,000 customers with approximately 50,000 M cubic feet of gas annually. In contrast, 170,000 customers in this area are consuming 40,000,000 M cubic feet of natural gas each year.

The gas industry has made greater progress in the decade just ended than in any similar period in its history. This is not only witnessed in the stupendous growth of the natural gas business but in the modernization of appliance design and the practical application of new methods and processes in the distribution and utilization of gas that have led to greater economy and safety in the operations of the business and in the use of gas by the customers. The market is supplied with a burner or appliance to meet every need. Automatic controls of various kinds perfectly handle all requirements for service and we approach a customer with utmost confidence in our ability to satisfy his desire whether the sale involves a gas range or a demand of 100,000 cubic feet of gas per hour in an industrial plant.

DISTRIBUTION ADVANCES

In the distribution field, great progress has been made. Seamless tubing and electric-welded pipe are furnished in 40-foot lengths to be welded or coupled together to form the bottle-tight systems carrying the modern high-pressure gas. Steel pipe is wrapped with a protective coating at the mill. The art of welding, gaseous and electric, has been highly developed and has been of great importance. Couplings, fittings and valves are obtainable to meet any and every requirement. Cast-iron pipe with rubber-packed joints has been developed and has met all of the tests of modern service, including its use for high-pressure gas transmission. Cast-iron pipes of small sizes are in practical use. The expense of pipe protection is now confined to those areas where it is warranted through the development of economical methods and devices whereby the soil may be quickly tested for corrosivity. Practical pipe finders and combustible leak detectors enable the distribution engineer to locate leakage at low cost and to standardize and modernize this highly important work. Methods of conditioning gas have helped to reduce leakage and service complaints and have prevented accidents.

The gas business has arrived at majority and those who have helped it grow need not feel ashamed of their part. This business did not "just grow," like Topsy, but it was helped along very considerably by those hardy gas men who were not satisfied to take things as they came and who were not afraid to think new ideas and try new methods, risking something for the results foreseen. As we stand upon the threshhold of a new decade, may our slogan prevail —"If it's done with heat you can do it better with gas."



10 YEARS in the South and Southwest

By P. McDONALD BIDDISON Consulting Engineer Dallas, Texas

THROUGH this period there has been such an abundance of gas supplies as to encourage development. Many pools young at the beginning of the period or still producing large quantities of gas have ceased to be of importance. Among these are:

Oklahoma: Osage, Stroud, Bearden, Hoffman, Bixby and Bald Hill, Sunny Side, North and East Bristow, Depew, Collinsville - Claremore - Owassa Area, Chickasha (Ramsey and Nichols Sands).

Texas: Panola County, Richland County, Refugio, White Point, Gas Ridge, Three Rivers.

Louisiana: Terrebonne.

Arkansas: Eldorado, Smackover.

Others developed early in the period have also ceased to be important such as:

Oklahoma: Red Oak, Warner, Okemah, Weleetka, Little River, Seminole.

Texas: Waskom, Coleman County, Brown County.

Louisiana: Pine Island, Sligo, Carterville, Cotton Valley (Blossom Sand).

Mississippi: Amory.

The Texas Panhandle, Monroe, La., the Corpus Christi-Laredo, Texas area and the Eastland-Breckenridge, Texas area continue to be the backbone of the supply for the transmission systems in and leading from this area, except that Oklahoma's numerous pools still suffice for that state with a substantial surplus for export. Large gas volumes have also been made available in connection with oil production in Oklahoma City field, Seminole, Okla. field, Conroe, Texas field, and Big Lake, Texas field. In the former the excess over the requirements for oil production is very rapidly diminishing and some of the larger operators no longer have gas available for pipe line use; and Seminole has no excess gas. Substantial pools developed during the period and still of importance are Clarksville, Ark.; West Carrol, La.; Jackson, Miss.; Cotton Valley (Trinity Sand), La.; Rodessa, La.; Quinton, Okla.; Pledger Field (Brazoria and Matagorda Counties) Texas. The Anderson County, Leon County and Freestone County, Texas area holds promise of being a supply of importance while Chickasha, Okla. looks promising from other sands and separate development northwest near Cement may mean a large pool. The Sunbright area of Tennessee has developed just enough gas to worry Chattanooga Gas Co. but not quite enough so far for any one to take the plunge and spend real money. A small amount of production was found near Tennessee-Alabama State line near Fayetteville, Tenn., but it has not developed into commercial importance.

MAJOR NEW CONSTRUCTION

The volume of construction in the period exceeds anything heretofore conceived, embracing such major projects as these:

Moody-Seagraves Group: This group through Houston-Gulf Gas Co. and Dixie-Gulf Gas Co., constructed a 16-inch system from Refugio area into Houston, an 18-inch system into San Antonio and a 22-inch system from Panola County, Texas into Houston. These properties have since been consolidated into the United Gas System.

Magnolia Petroleum Co. through affiliated companies (Latex Gas Co.) built a 14-, 16- and 18-inch tapered line from Waskom and Panola fields in Texas to Beaumont and Port Arthur and to Dallas and Fort Worth and extended these systems for additional supplies into the Monroe and Richland fields of Louisiana.

The Houston Oil Co. through an affiliate (Houston Pipe Line Co.,) laid a 16-inch line from Refugio to Houston. This line has since been extended westward into the Laredo district for additional supplies.

North Texas Utilities (Upham) built a 16-inch line from Wheeler field in the Texas Panhandle to Wichita Falls. This system is now part of the United Gas System.

Prairie Oil and Gas Co. through affiliated companies constructed the system of South Plains Pipe Line Co. to Lubbock and numerous other northwest Texas towns.

Consolidated Gas Utilities Co. constructed from the Texas Panhandle a 14-inch line which, connected up with the old Laritan System in Southern Kansas, brought Texas Panhandle gas to Wichita, Kansas.

The Stamford and Western Gas Co. laid a branch system from the North Texas Utilities main line giving services to Seymour, Rotan, and Anson. This property has since been acquired by Lone Star Group.

The El Paso Natural Gas Co. through a 16-inch line brought gas 212 miles from the Jal, New Mexico area into El Paso. This system has been extended via Douglas, to Bisbee, Tucson, and Phoenix, and Cananea, Mexico.

The Southern Union Gas Co. constructed small systems in the Pecos River and western area from the Jal, New Mexico area and McCamey, Texas oil field.

The Texas Public Service Co. (Subsidiary of Peoples Light and Power Co.) constructed an 8-inch system from near Brownwood, Brown County, Texas to San Angelo and supplemented this supply by a 12-inch line from the Big Lake oil field of Texas to San Angelo.

The Rio Grande Valley Gas Co. in the Rio Grande Valley constructed a 12-inch main line system giving gas service in the Rio Grande Valley from Mission, Texas down to Brownsville.

The Lone Star Gas Co. has constructed an 18-inch line from Wheeler County to Petrolia and thence a 20-inch to Fort Worth and doubled its capacity from Central West Texas into Fort Worth-Dallas area by an additional 18-inch line. The Lone Star also in this period has extended transmission lines to serve new territory southeast and northeast of Dallas. In 1934 it laid a 12-inch line from the new Anderson County, Texas field to feed into its system near Waco. It also has acquired the properties of Stamford and Western Gas Co. in northwest Texas, the distribution systems of Texas Cities Gas Co., the Hall and Briscoe properties in Chickasha, Okla. field, and numerous miscellaneous producing properties with short transmission systems in the Central West Texas area. Through Community Natural Gas Co. it has made natural gas service available to a large number of Texas and Oklahoma towns which had previously had no gas service of any nature. This company since 1923 has been a large purchaser of casinghead residue gas in Central West Texas area. Finding early in its experience that such rich heavy gases did not interchange readily in domestic use with the gases being handled from other sources, the company resorted to stabilization of such gases at Joshua (near Cleburne), Texas by dilution with the inert products of combustion. The stabilization corrected all the difficulty, stopped the trouble the domestic users had been having and everything was lovely for about nine years,

till the professional saviours of the people in one of their large markets found that gas was being diluted. It is now the subject of argument in Fort Worth and Dallas with all engineering and scientific talent so far reporting upon it having supported the company except the Bureau of Standards representative who through a series of experiments with synthetic gases on ranges of up-to-date design (which class probably covers the combustion characteristics of less than 10 per cent of the equipment affected) derived a formula which he thinks indicates stabilization is unnecessary. Experiments are now under way to test the validity of his theory. It may be that the New Deal will make it work better than it did when tried in practice on a large scale 10 years ago, and again it may not.

The Public Service Corp. of Texas and its associated company, The Mobeetie Gas Co., laid a transmission system from Wheeler County to serve Canadian, Spearman, Perrytown, and Mobeetie, Texas, with a branch through Shattuck, Okla. to Supply, Okla.

The Wheeler Gas Co. in the Texas Panhandle built its system to serve, Wheeler, Briscoe, Allison, and Reydon, Okla.

The Arkansas Natural Gas Co. extended its facilities by construction of a 10-inch line from the Clarksville, Ark. field to Little Rock; by construction of a 20-inch line from Monroe and Richland fields to Shreveport; by acquisition of the 16-inch line from the Monroe field to Eldorado constructed by Sam Hunter interests; and by acquisition of the 12- and 14-inch system from the Monroe Field to Eldorado and Camden, Ark, built by Industrial Gas Co. It also acquired the properties of Reserve Natural Gas Co. from Webster Parish to Shreveport, from Waskom and Panola Counties to Shreveport, the properties of Southwestern Gas and Electric from Waskom and Panola Counties to Shreveport and Texarkana, the distribution plants at Shreveport and Texarkana, and other distribution properties.

The Interstate Natural Gas Co. constructed a 22-inch system from the Monroe field 170 miles to Baton Rouge. It has since looped about 94 miles of this line. A field station of 6,600 h.p. and a line station of 7,700 h.p. at Ferriday constitute the compressing equipment. The major markets are S. O. Refinery at Baton Rouge and supply for New Orleans. Southern Gas and Fuel Co. extended from Baton Rouge to New Orleans with an 18-inch line. This latter is now part of United Gas System.

The Mississippi River Fuel Co., controlled by the major producers of gas in the Monroe, La., field, built a 22-inch line from the Monroe field to St. Louis.

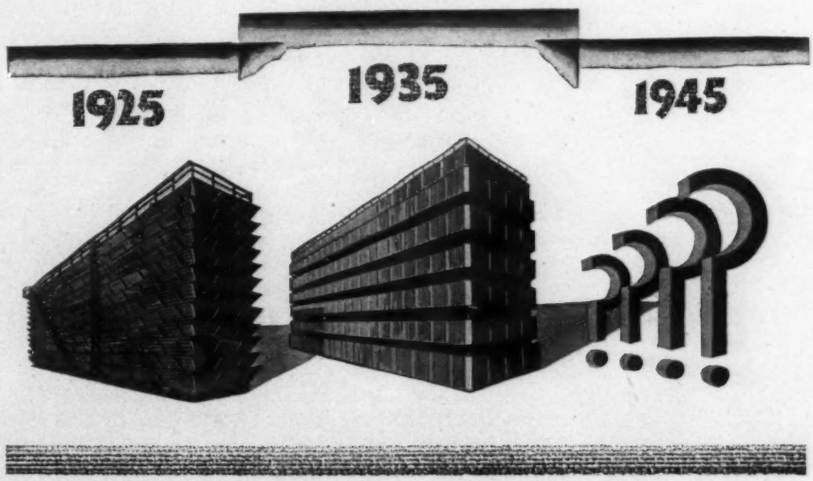
The Memphis Natural Gas Co. built an 18-inch line from the Monroe field to Memphis, Tenn., and later extended to Jackson, Tenn.

United Gas System: This system represents the largest consolidation of separately constructed property during the period. It is built up in the main of the Palmer Corp. properties in Louisiana, the Gas By-Products properties in the Monroe and Richland fields in Louisiana and Bethany field Texas, the Latex properties built by Magnolia Petroleum Co. from Waskom field to Dallas, Waskom to Beaumont and Port Arthur, and Waskom field to Monroe and Richland fields, the Moody-Seagraves lines (Houston-Gulf and Dixie-Gulf) from the Corpus Christi area to Houston and San Antonio and from the Waskom, Texas field to Houston, the North Texas Utilities line from the Panhandle to Wichita Falls, and the Southern Gas and Fuel System from Baton Rouge to New Orleans. There were numerous extensions to this system made shortly after consolidating, the largest being a system from Kirbyville, Texas across southern Louisiana. This property is in the Electric Bond and Share Group and represents their entrance into the natural gas field following almost immediately upon their practical retirement from the gas business in this area.

In the *Fort Smith Group* consisting of Fort Smith Gas Co., Southern Gas Producing Co., Twin City Pipe Line Co., Industrial Oil and Gas Co., Western Oklahoma Gas Co., Arkansas-Oklahoma Gas Co., Southwestern States Gas Co., and Ozark Natural Gas Co., and serving Fort Smith, Van Buren area together with some eastern Oklahoma towns, transmission lines have been laid, 12 miles of 8-inch from Gans, Okla. to Fort Smith, Ark., 8 miles of 4-inch from Central City, Ark. to Greenwood, Ark., and 15 miles of 10-inch from Lavaca, Ark. to Fort Smith Ark.

Oklahoma Natural Gas Co. has increased its mileage of transmission lines during this period by over 70 per cent,

(Continued on Page 52)



10 YEARS in the Midwest

By CRAIG ESPY Midwestern Manager, Western Gas
Chicago, Illinois

IN AN era when gigantic pipeline undertakings were at their height probably the industry records no greater development than that of bringing natural gas to Chicago, the city of 3,524,000 souls, and the second in point of population in the United States.

In 1925 the entire state of Illinois yielded only 11,700 natural gas customers and today the Metropolitan district of Chicago alone provides mixed gas to more than a million customers.

Of great interest also in recent months has been the fact that Minneapolis and Omaha have turned to the fuel for enrichment purposes. At the same time that Minneapolis is utilizing the fuel for enrichment in place of oil, it is adjusting the appliances of its consumers preparatory to serving 800 B.t.u. gas beginning in June, at the completion of adjustments.

LARGER SYSTEMS SERVING MIDWEST

Natural Gas Pipe Line Co. of America, to reach the Chicago market, transports the gas from Gray, Okla., through the states of Kansas, Nebraska and Iowa to Joliet, Ill., a distance of approximately 822 miles. The Texhoma Natural Gas Co., an affiliated company, gathers the gas through two main trunk lines, 24 inches in diameter, one extending into the western portion of the Texas Panhandle gas field and the other into the eastern part of the field. Including 1935 additions to the system Texhoma Natural maintains 172.6 miles of system, 78.8 miles of this being 24-inch line. One compressor station boosts the gas to Gray, with nine other stations operating along the course of the line in bringing the gas to Joliet.

Gas transported through the line is utilized by 1,203,100 gas customers in 150 communities embracing a population of 4,481,500 inhabitants.

At Joliet, the principal point of sale, gas is sold to the Chicago District Pipeline Co. which in turn sells it to the distributing companies supplying most of the Chicago Metropolitan area.

The aggressive sales activities of the companies are reflected in the comparison of the sale in 1931 of 5 million cubic feet; 28 million cu. ft. in 1932 and 45 million in 1934.

The gas sales of the pipeline company have been:

	Domestic	Industrial	Total
1931	3,761,650	1,681,861	5,443,511
1932	18,826,287	9,354,199	28,180,486
1933	20,374,554	4,961,568	25,336,122
1934	24,427,016	21,456,149	45,883,165

Another of the nation's longest trunk line systems is an achievement of the latter half of the past decade. Minneapolis now stands at the apex of the Northern Natural Gas Co. system, which originates in the Panhandle fields of Texas and carries gas 1,000 miles to its extreme points of delivery.

Organized in April, 1930, with ownership vested in North American Light & Power Co., The United Light & Railways Co., and Lone Star Gas Corp., this system now serves gas to cities and towns having a population of 1,408,385 and 305,385 customers in these cities.

The end of 1930 saw 44 towns and cities served from the line, with the outreach being extended into Iowa and Minnesota in 1931. During the year 62 more towns were added. Twenty additional towns joined the group in 1932, six in 1933 and seven in 1934, for a total of 139.

Northern Natural presents one of the finest examples in the industry of successful load-building from a major cross-country carrier. It serves, through 2,000 miles of transmission line, the major cities in its area such as Minneapolis, Omaha, Lincoln, Council Bluffs, Sioux City, Des Moines, Fort Dodge, Mason City, Sioux Falls and Rochester.

While not serving the city of St. Paul with domestic gas, the packing plants in South St. Paul were piped for this fuel in 1934. Most of the major packing plants, cement plants and power plants in the entire sweep of its system are utilizing natural gas. The company has also been instrumental in developing a high percentage of the possible house heating load in its area.

A third major project entering the Middlewest from Southwestern fields has been the Panhandle Eastern line with its terminus in Indiana. The line originally started under the name of the Missouri-Kansas Pipeline Co., later to assume the name that it now bears.

In September 1930, nine months after the project had been started, a half interest in the line was bought by the Columbia Oil & Gasoline Corp. At Rockville, Indiana, the line ties into the Columbia Gas & Electric Corp.'s main line from Muncie, Ind.

From the line's beginning point at Liberal, Kansas to Rockville, Ind., it embraces a distance of 850 miles. The diameter of the line is 24 inches. Cities in Illinois, Missouri, Indiana and Kansas have been the main recipients of gas in addition to that flowing farther east through the Columbia system.

A glance backward as far as 1927 reveals the construction by Cities Service of its Amarillo-to-Wichita line, that was extended a little later to Ottawa and Kansas City.

Montana-Dakota Power Co. in 1928 constructed a line, 175 miles in length, from the Baker-Glendive fields in Montana to the Black Hills communities in South Dakota. Later the company was also to carry gas into important cities in North Dakota.

Cities Service completed a line in late 1928 from Leavenworth, Kansas to St. Joseph, Mo., natural gas being turned on in the latter place on January 15, 1929. Cities Service also completed in 1929, a 73-mile 10-inch line from Joplin to Springfield. In 1930 the company began a line from Ottawa to Sedalia, a distance of 110 miles.

Considerable information is also recorded about the activities of the Western Gas Co. of Salina, Kan., for the year 1929 in connection with gas service to towns in Central Kansas. This company and Western Pipeline & Gas Co. were purchased this same year by North American Light & Power Co.

In the earlier Kansas development, Moody-Seagraves interests had developed a system operating out of the Stevens County field, serving 15 towns, through 150 miles of transmission line. This was later purchased by the Northern Natural Gas interests.

Kansas Pipeline & Gas Co., organized in 1926, was responsible for considerable Kansas development in earlier days. This company, a subsidiary of North American Light & Power, constructed in 1929 alone, 350 miles of gas system, the largest unit being 158 miles of 16-inch pipe from Abilene, Kan., to Grand Island, Neb. The company is credited with 730 miles of line laid in 1930 and 765 miles in 1931.

In 1931 this company was identified with the reconditioning of the Stanolind oil line extending from Welch, Wyo., across Nebraska and part of Kansas to Freeman, Mo., leasing 300 miles of the line for its use.

North Central Gas Co., organized in 1931, leased 400 miles of the Stanolind line, from Welch, Wyo., to Keystone, Neb., reconditioning it for gas service. Six Wyoming and 12 Nebraska towns were added to the line as gas users.

In 1929 and 1930 towns in Nebraska began to be attractive to natural gas interests. Cities Service was one of the first companies to cross into the state, completing in 1929 a 53-mile extension north from Atchison, Kan. to Falls City, Neb. In 1930 the company constructed an 8-inch line from Lyons, Kans., to Superior, Neb., a distance of 116 miles.

Nebraska Pipe Line Co., a Clement Studebaker interest, and the Nebraska Natural Gas Co., holding franchises in 20 Nebraska towns, were organized in this period.

1925 CONTRAST

To appreciate more fully the outstanding contribution of the natural gas industry to the Middlewest, during the decade, one has but to glance back at the records available for the year 1925.

Kansas and Missouri were producing and distributing considerable natural gas during that year, but practically speaking, it was unavailable to any other states in the group.

Today natural gas is piped to more than a thousand towns in the area, with the consumers reaching almost to the 2 million mark. Natural gas is saving these companies many millions of dollars annually in fuel costs.

The great fields of the Southwest have given unstintedly of their fuel for this area, production interests, pipeline companies and gas distributing companies all sharing in the vast project of linking these supplies to the important Midwestern markets.

Manufacturers of equipment have also added to the spread of natural gas influence. Lower priced and more efficient gas-burning equipment has been placed on the market giving the most modest of homes and, as well, the largest industrial establishments the benefits of this ideal fuel.

THE "ANTI-MERCHANDISING" FUROR

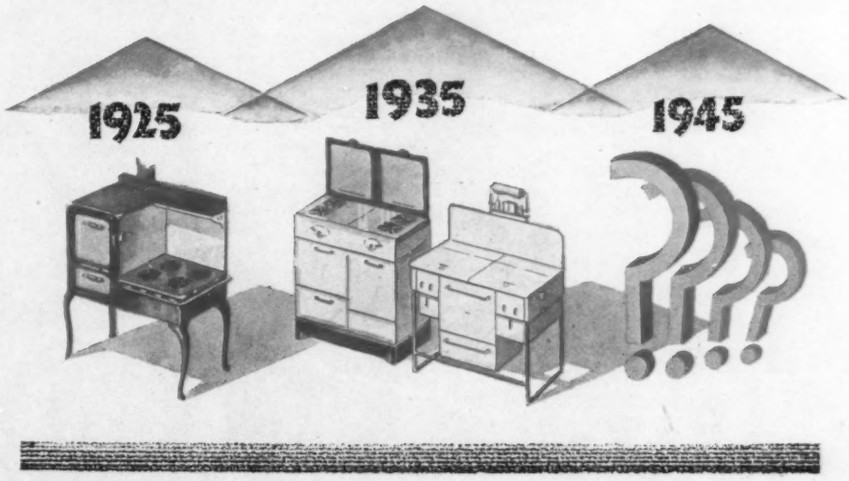
During the decade such items as anti-merchandising legislation have tended to influence the policies of the industry. Gas companies of Kansas and Missouri in the Midwest, as well as Oklahoma, bore the brunt of this attack. Utility leaders of these states had good reason to declare that the anti-utility merchandising propaganda was nothing more nor less than a smoke screen for municipal ownership, trumped-up by professional agitators. Other sections of the country were by no means immune, but the movement reached its climax in enactment of the Kansas and Oklahoma statutes prohibiting appliance selling by utilities.

A severe blow was dealt the movement in the state of Kansas when the bill passed by the state legislature was successfully contested by the Gas Service Co., a Cities Service interest. This action led on June 10, 1933, to a Kansas Supreme Court decision holding the law unconstitutional, in violation of the 14th Amendment in denying certain individuals, firms and corporations the equal protection of the law.

In Missouri the anti-merchandising measure was defeated in its earlier stages through the well-directed efforts of the utilities, especially as directed through the Missouri Association of Public Utilities. A campaign of advertising launched by this association pointed out in no uncertain manner facts that should be known about utility merchandising, and citing particularly the benefits of utility merchandising.

There has come about in the area increasing recognition of the position of the dealer in the successful merchandising picture. Some of the leading utilities have banded the dealers in their territories into organizations for a better understanding of mutual problems and for promotion of merchandising education among dealer employees. The Gas Appliance Society of Metropolitan Chicago, composed of utilities, dealers and manufacturers of gas appliances, provides one of the finest examples of the successful maintenance of an organization of this type.

As a part of this trend, utilities which in past years would have welcomed an exclusive appliance distributorship in a city, now encourage the manufacturer to place his line with as many dealer stores as possible in order to provide more outlets for the modern appliances.



THE NEXT 10 YEARS

members of WESTERN GAS' original board of editorial advisors gauge needs and trends for the decade ahead

Slogan for Next Decade

WHEN the Directors of the Pacific Coast Gas Association approved in the year 1925 the idea of a gas journal for the Pacific Coast and lent their support, it was the writer's hope that such a magazine would be devoted more particularly to commercial activities.

As the years have rolled by, *Western Gas* has taken a well deserved place as an outlet of expression for our Pacific Coast gas industry, and there seems to me to be an increasing need for a forum where our dealers, gas appliance manufacturers and utility sales departments may meet on a common ground of sales and service to the consumer.

While we will continue during the next decade to have our problems of gas manufacture and distribution, the most important issues of our industry will undoubtedly be those concerning holding and increasing the sale of our product by means of improved service, more modern and efficient appliances, cooperative promotion and sales efforts, which in turn imply the building of correct policies, coordinated effort and reliable information disseminated systematically to the individuals in the affiliated industries.

Whereas the old slogan of the gas industry was "Profits are made and lost in the retort house," the one for the next decade should be "Profits are made on the consumer's premises."

E. L. HALL
Operating Manager,
Portland Gas & Coke Company

Cooperative Results

IN MY opinion this should be one of the best years that the gas industry has had. There is no place in the United States where the gas companies are doing more for the interests of the gas industry than they are on the Pacific Coast. There is sincere cooperation going on at the present time, there is a better understanding between the gas companies, dealers and manufacturers, and this cooperation enables the dealers, gas companies and manufacturers to become better acquainted; as a result, instead of being competitors, the trend of thought is more constructive in pulling together to devise means of increasing the sales of gas appliances. As far as we are concerned, we are working very closely with every gas company on the Pacific Coast and are getting very good results.

H. W. JACKSON
Vice-President and General Manager,
James Graham Mfg. Co.

Give Superior Service

THE stability of the gas industry will prevail in spite of the increasing competitive situations, which this industry will be called upon to meet during the next 10-year period.

During the past decade, we have been preparing for what is to come and have built a solid foundation. Compare our gas-burning appliances today with those of 1925, and also note the development in our sales procedures and in our dealer cooperative plans.

To the extent that gas can render a superior service at a lower cost, will it overcome competition, and in this respect natural gas has the greatest advantage. The gas industry must be prepared to render ever increasing superior service.

WM. MOELLER, JR.
Vice-President in Charge of Natural Gas Production and Transmission,
Southern California Gas Company

Building Into Prosperity

WE are approaching the end of a business depression the like of which we have never seen before and trust we shall never see again. Through it all, I believe the gas business carried on with as little loss as any of the major industries. This is because it has become an essential business. Gas has ceased to be just desirable and has become both desirable and necessary to the householder and industry. We have heard people say during the past six years—"Well, I have given up everything now but my automobile and my gas furnace. I will give up the automobile next but hope I can retain my gas heat." This illustrates the place gas occupies in modern life. There is no substitute.

We lost some of our gas customers but are gaining them back gradually. There are some disconcerting problems before us but we are hoping for a reasonable consideration which will allow us to progress. We believe that every gas customer which was lost due to economic features of the depression will be returned promptly, that the financial restriction is removed and confidence restored.

It took five years following the World War to catch up with our building facilities. During this time our customer growth was the greatest in our history. There has been scarcely any building since 1929. I predict that the restoration of confidence will allow business to resume normal tendencies which in turn will stimulate building and we will build ourselves into prosperity again. Our gas business will improve proportionately as business improves and as building goes on, and I believe we are standing on the threshhold of a new decade in the gas business, which will equal, if not excel, the last one.

GEO. WEHRLE
Superintendent Gas Department,
Public Service Company of Colorado

Two Primary Tasks

THE gas industry is faced by two major problems, both of which demand solution in the early years of the next decade:

(1) To complete the already-undertaken task of placing gas service in the public esteem as a modern domestic facility with high aesthetic values, and not merely as one of the most commonplace and homely utilities.

(2) To administer an effective antidote to the baseless anti-public utility agitation which has been one of the accompaniments of the economic depression.

Both of these are selling jobs. Both require the informed cooperation of every element of the industry.

Number one of the foregoing items is the legitimate offspring of the highly competitive day in which we live and of the trend for improvement and refinement in every product and service intended for use in the American home. We should welcome it as an element of progress—and do.

Item number two exists only because men are willing to take advantage of the cred-

TO those members of the western industry who gave of their time and interest, as editorial advisors to WESTERN GAS during the magazine's formative period, the publishers express a lasting obligation. It is gratifying to present the views of these men in the Tenth Anniversary Edition. Their statements on current condition and outlook within the gas industry constitute a splendid cross-section of gas company and manufacturer executive viewpoint. — EDITOR.

ulity of an uninformed public to enhance their political fortunes by attacking legitimate business with false charges. It is a form of racket not covered by the penal codes, but nevertheless productive of great injury to society. We must resist this practice by every necessary and proper means of public education.

No doubt there are other important tasks awaiting accomplishment in the ensuing decade, but these two seem to be preliminary to anything else.

ADDISON B. DAY
President and General Manager, Los Angeles Gas and Electric Corporation

Ultra-Modern Appliances

THE gas utility has a place in community life and its service is necessary and indispensable.

During the past six years the gas industry has not suffered to the same degree as other industries as a result of the trying economic conditions, and there is no question as to the future and security of the industry if it receives fair play with regard to rates and taxation and holds the confidence and interest of the public.

The recent attack upon holding companies is contributing much to the present unrest of utility stockholders. The fact should not be overlooked that these same holding companies have contributed much to the prosperity of the community in which their holdings are located and it would be a mistake to discourage their constructive influences.

Great strides have been made in gas load-building, with indications of material increases in the immediate future due to the interest of manufacturers and their progress in building new ultra-modern appliances such as gas ranges, automatic gas water heaters, refrigerators, and house-heating equipment, all of which when placed in service under the present existing gas rates will successfully meet competition.

With the return of business to normalcy the gas industry will continue to prosper and rank among the successful enterprises of the country.

W. M. KAPUS
President, Northwest Gas & Electric Equipment Co.

Grounds for Confidence

TEN years seems like a long time when looking forward to it, but it has been an unbelievably short period when looking back upon it.

What advances have come in the gas business since the first issue of *Western Gas!* At that time gas refrigeration was an infant with no practically successful boxes in production. Yet today, all over the country, a tiny flame is preserving food and safeguarding health in thousands of homes.

Ten years ago there was no such thing as gas air conditioning. Yet last year in the Philadelphia territory there was a model home, visited by hundreds of people, which was completely conditioned through use of gas.

Gas house-heating, particularly as a result of more wide-spread distribution of natural gas, has increased tremendously within recent years. The comfort of automatic heat has been brought to many people.

The gas range of 10 years ago would look like a museum piece if placed alongside a 1935 model. Full automatic controls, oven and top burner lighters, eye appeal and gleaming porcelain table-top designs, complete insulation—even cooking by the clock—all of these things have come with the passing of time.

With this picture in the immediate past and its accomplishment well within the memory of most of us, is there any possible reason why the gas industry, despite its troubles at the moment, cannot look forward with complete confidence to the developments—most of them now even unsuspected—that will bring prosperity to it during the next decade?

GEO. E. WHITWELL
Vice-President in Charge of Sales, Philadelphia Electric Co.

Leadership Spells Progress

TO *Western Gas* on the occasion of its 10th birthday the Pacific Coast Gas Association extends not only its congratulations but its gratitude for 10 years of loyal cooperation.

During these 10 years *Western Gas* has attained national recognition, a feat seldom if ever before accomplished by a Pacific Coast magazine, but this has been achieved without in any way overlooking the needs of the Pacific Coast. May the next 10 years bring you increasing prosperity just as certainly as it will bring you increasing opportunities for service.

While it may seem rash to make any predictions for even the immediate future of the gas industry, I am convinced that the industry will continue to grow and prosper. It is only rarely that the laws of sound economics can be set aside by man-made laws. Until that day when man learns to directly harness the sun's rays gas will remain the same superior fuel it is today. There are vast markets open to us now, and as we improve our appliances and methods new uses and new markets will appear. The industry must be alert to its opportunities and free to take advantage of them. To overcome the obstacles created by the competitive and political conditions existing today wise and courageous leadership will be required, but there can be little doubt that we have and will continue to have adequate leadership. The associations and publications of the industry will become increasingly important because cooperation among the units of the industry and the rapid dissemination of information and inspiration between them will be our strongest weapons.

CLIFFORD JOHNSTONE
Managing Director, Pacific Coast Gas Association

Improved Selling Evident

IT DOES not seem possible that a decade has passed since *Western Gas* began its service to the gas industry.

I recently returned from a trip which took me all through the States of California, Arizona, Nevada, Utah, Idaho, Oregon and Washington, and throughout this vast area there are definite signs of more aggressive sales activity on the part of gas companies and dealers than has been observed since prior to 1929.

Governmental activities such as represented in Boulder Dam, and Grand Coulee in the Northwest, undoubtedly have had some influence on sales policies in the areas affected. Well-planned sales activities, aggressiveness, and a bolder attitude toward all competition has taken the place of the characteristic complacency of the gas industry. Sounder dealer cooperative plans are under way in important cities of the Western area. Apparently dealers and gas companies are

awake to the necessity for complete cooperation and understanding.

The major fear that grips utilities and business is the political situation at Washington. Uncertain as to legislation and taxation and the trend toward the left has shaken business confidence.

Business recovery would be more rapid if the manufacturers and other business enterprises had any assurance of less Governmental interference.

I believe 1935 will show some gains over even the improved condition of 1934. Our company has plans under way for a greater coverage of the Pacific Coast area.

C. B. BABCOCK,
President,
C. B. Babcock Company

Merchandising Strides

CONGRATULATIONS to "our" *Western Gas* on its 10th birthday!

I am sure that the entire industry will agree that *Western Gas* has exceeded our fondest expectations in its first 10 years of existence and we look to many more pleasant years of association.

The past 10 years? Well, the gas industry has nothing to apologize for. It has probably made greater strides in merchandising than in any former decade, even though half of the period was during the worst depression our country has ever experienced. The utility companies generally, with a policy of real dealer cooperation, have made wonderful progress in appliance merchandising. In the next 10 years I expect to see even greater progress, as most utility companies now realize that first class merchandising methods and men are as necessary in the gas business as in the mercantile trades.

Small dealers especially need advice and guidance in successful merchandising of gas appliances, and logically should look to their local utility company for such help. Many times the local gas company, equipped with a high class merchandising personnel, can better apply its merchandising ideas to local conditions than can a manufacturer, who often is far distant from the scene of operation.

In the next 10 years the natural gas distributing lines will probably be increased by many thousands of miles and with the advent of natural gas to practically all of the cities in the United States the gas appliance manufacturers should have the opportunity for a large increase in volume of business. But the manufacturer must do his part.

In my opinion, he who constantly improves his product and develops new and better appliances will enjoy the larger share of the business. I believe it would be a step forward for the American Gas Association in conjunction with the testing laboratory and with the assistance and cooperation of the utility companies to devise some means for encouraging new products and improvements on existing appliances.

Given a return to normalcy the next 10 years should be the most prosperous decade in our industry and we unquestionably will be overlooking a big opportunity, if we are not prepared for it.

R. G. LOGUE
Vice-President,
Ward Heater Company, Ltd.

Facts vs. Propaganda

IF any man was prophet enough to truly picture the outlook for the gas industry for even the next year, he would be a wizard. There are certain fundamental thoughts which seem to me to lay a foundation upon which the industry may stand.

Outside of the attack being made upon the holding companies, the gas industry has not been a prey to as much mad, useless and devastating propaganda as has the electric industry. So the outlook from this angle is disquieting and justly so if Congress passes some of the legislation proposed. If nothing drastic is done, however, the gas industry may look forward with less apprehension than the electric industry. One of the greatest problems seems to be to get the true picture before the public. The public mind has been so inflamed against anyone holding property or serving the public that it seems to me it is time for the utilities, through paid advertising, if necessary, to tell the true story as it is. It is impossible to picture what the American public would do without gas and proper service. It is also true if they could be impressed with the true record of progress, rate structures and continued effort to give them more for the dollar, which is being made by the gas industry constantly, they would not listen to the propaganda which is being spread. The general public is fair but does not know the truth, and never will unless it is told fearlessly by the utilities.

One thing is certain, the gas industry as such will survive because of the sterling men whose lives are being spent in doing everything possible to bring this boon to humanity forward continually to the betterment of human comfort and convenience.

H. R. BASFORD
President, H. R. Basford Co.

Progress Through Sales

WE, in the gas business, are confronted today with a number of uncertainties. Prominent among these are the threats of arbitrary rate reductions and the threat of increased taxes due to the activities of politicians scrambling for more money to satisfy their constituents. However, from a strictly sales viewpoint, I think our progress in Northern California in the next few years will be steady, but not in any way spectacular.

We have just passed through five years of intensive gas load-building in the territory of the Pacific Gas and Electric Co. Coinciding with this intensive selling campaign were five long years of depression and a period of more or less reckless competition. We have, nevertheless, been measurably successful in overcoming most all obstacles in our load-building effort to recoup some $8,000,000 in reduced revenue due to the introduction of natural gas in Northern California in the year 1930. In addition to this reduction in gross revenue, the company was required to expend in the neighborhood of $25,000,000 to pipe the gas into our territory from Kettleman Hills. The problem obviously was—how were we to get some of this money back?

With the depression already upon us, there was only one way out and that was by loading existing facilities. To make a long story short, a united gas industry was successful during these five years of depression in selling some 393,887 major domestic gas appliances in our territory, representing a total investment by the purchasers of $36,982,885. This tremendous investment by consumers for gas appliances was the result of perfect harmony on the part of the gas industry as a whole, and it was partly made possible by accumulative gas rate reductions by the company, amounting to over $40,000,000, during the same period. In accomplishing this job, domestic consumers on the average were required to absorb 65 per cent more B.t.u.'s and we are still short some $2,323,000 of recovering a gross of $16,108,000 received from domestic consumers in 1929.

Therefore, from a gas load-building viewpoint, especially in the domestic field, the cream of the gas business in Northern California has been sold and the remaining potential new gas business is naturally going to be more difficult to sell. However, from the viewpoint of the gas appliance manufacturer and the gas dealer, there exists a large market for appliances. Our surveys indicate that there is a replacement market in our territory amounting to $67,200,000 for domestic gas appliances, and the market for new installations amounts to $10,500,000, or a total of $77,700,000. These figures do not take into consideration the growth we know is going to come to us in Northern California in the next several years.

Sixty per cent of the commercial building heating business has been sold to gas in Northern California, and the balance of this business is going to be difficult to obtain as it largely consists of second and third-rate establishments, operating on very close margins of profit and where there is little possibility of their being able to finance gas installations.

In the industrial market there probably lies the most lucrative field for increasing gas sales for the next several years, as in this

field, where operations have been down, there exists the greatest possibilities of expansion, but due to the shifting nature of this class of business and its dependence on economic prosperity, too much reliance should not be placed on this market.

There are definite indications that the economic picture for 1935 and 1936 will be considerably better, especially in Northern California, but it is going to take real selling and real advertising to loosen up those deep-seated habits of economy so prevalent among people generally. Too often we find organizations who think that when times improve they can lessen their sales effort. The fallacy of this theory has been demonstrated many times.

No poorly organized, half financed or weak selling effort is going to get anywhere in the present market. It is going to require the best kind of advertising and selling methods. It is necessary also that the merchandise be attractive, with high standards of quality and fair prices, and I believe the manufacturers have supplied these latter important essentials. Finally, it must be borne in mind that we are going to have the keenest kind of competition from other industries for the consumer's dollar, and there is nothing that can be more effective in accomplishing our ends than adequate man-power.

H. M. CRAWFORD
General Sales Manager,
Pacific Gas and Electric Company

10 YEARS AGO

a few high spots . . . reported from the first 12 issues of WESTERN GAS

Volume 1, Number 1 of *Western Gas* off the press May 1, 1925.

Record time made on 84-mile Ventura-Los Angeles line by Southern Counties Gas Co.

R. M. Conner of Portland Gas and Coke Co. selected as director of American Gas Association's Testing Laboratory at Cleveland, Ohio. (Laboratory operations begins July 31, 1935.)

Pacific Meter Works, American Meter Co., completes office buildings in Los Angeles and San Francisco.

Industrial Fuel Supply Co. adds new compressor plant to Dominguez field, Southern California.

Jack P. Davidson made Estate Stove Co. California representative.

A.G.A. course in gas manufacture, distribution and utilization inaugurated at Columbia University.

O. L. Moore made manager of customers' department, L. A. Gas and Electric Corp.; E. N. Simmons, auditor.

Largest waterless type gas holder in west, 15 million cubic feet capacity, erected at Los Angeles by The Bartlett Hayward Co. for L. A. Gas and Electric Corp.

A. B. Macbeth made executive vice-president of Southern California Gas Co. and Midway Gas Co.; F. J. Schafer becomes general manager of the Southern and Wm. Moeller, Jr. general manager of the Midway.

F. S. Wade named vice-president and general manager of the Southern Counties Gas Co.

Pacific Coast Gas Association, Clifford Johnstone, executive secretary, moves office to 447 Sutter Street, San Francisco, California.

New York Oil Co. lays 75-mile line from Sand Draw to supply Casper, Wyo.

Two new oil gas generator units added, one at San Francisco, one at Oakland, by Pacific Gas and Electric Co.

Gaffers and Sattler, Los Angeles, begin manufacture of Premier gas ranges.

Floyd R. Norgren leaves Spokane Gas and Fuel Co. to direct new business departments of 15 companies subsidiary to Kansas City Gas Co. Succeeded at Spokane by A. A. Salmon.

Pacific Gas and Electric Co. makes $10,000,000 bond issue.

Buck Stove and Range Co. building new office and warehouse in San Francisco.

Geo. E. Whitwell leaves Tacoma Gas and Fuel Co. to take charge of gas sales promotion for Byllesby Engineering and Management Corp. at Chicago.

Thirty-second annual convention of Pacific Coast Gas Association, E. L. Hall president, held at Portland, August 17.

Gas service restored promptly at Santa Barbara by Southern Counties Gas Co. workers, following major earthquake.

Gas Appliance Association of Southern California completes organization, with E. A. Norton president and George Finney secretary.

Executive offices of C. B. Babcock Co. moved into new building at San Francisco.

F. J. Schafer elected president of Pacific Coast Gas Association, succeeding E. L. Hall.

Midway Gas Co. lays Ventura-Castaic 52-mile 12-inch line.

L. J. Breuner elected president of Gas Appliance Society of California, at fall convention held in San Francisco August 13. (F. U. Naylor, secretary).

Plans for a municipal gas plant made for Long Beach, Calif.

Two new generators raise Portland Gas and Coke daily capacity to 30 million cu. ft.

D. L. Scott made manager of public relations for L. A. Gas and Electric Corp.

Central Arizona Light and Power Co. erects high pressure holder.

Ventura compressor station begun by Midway Gas Co.

Over 3,800 attend A.G.A.'s 7th Annual Convention, Atlantic City, October 12. H. C. Abell elected president, A. B. Macbeth, vice-president.

British Columbia Electric Railway Co. inaugurates free-loan, easy-purchase plan on gas ranges and water heaters.

Tucson Gas, Electric Light and Power Co. completing new holder.

Gas Appliance Association of Southern California formulates 15-lecture course on gas appliances, with Walter M. Berry as instructor.

Twelve high pressure storage holders installed in Southern California communities by Southern Counties Gas Co.

Plans laid for gas service in Imperial Valley, Calif. by Inland Empire Gas Co., H. W. Burkhart president.

Geo. D. Roper, head of Roper Corp., dies at Rockford, Ill. at age of 70.

Annual meeting of California Gas Research Council held in San Francisco; Walter M. Berry executive engineer.

Canadian Western Natural Gas, Light, Heat and Power Co. Ltd., completes second line from Turner Valley to Calgary.

American Petroleum Institute and Association of Natural Gasoline Manufacturers hold annual convention in Los Angeles.

Los Angeles carbon monoxide investigations completed by technical committee.

California Natural Gasoline Association organized; Paul D. Barton president.

Bessemer Gas Engine Co. appoints Ben C. Dumm as California manager.

Society of Gas Lighting holds 50th annual meeting at New York, electing Dr. A. C. Humphreys president.

Lee Holtz made assistant superintendent of distribution for Southern California Gas Co.

Natural gas piped for first time in Colorado, from Wellington Dome fields to Fort Collins, by Public Service Co. of Colorado.

Pacific Gas and Electric Co. takes over Sacramento Gas Co.

Mare Island Naval Yards equipped for gas service by P. G. and E.

Geo. W. Smith made chief commercial agent for Southern Counties Gas Co.

T. J. Protheroe, general agent Southern California Gas Co., dies January 29.

Reliance Manufacturing Co. erects plant at Alhambra, Calif.

Pacific Gas and Electric Co. constructs gas plant at Marysville to utilize California and Utah coals.

Gas Appliance Installation and Service Manual issued by Pacific Coast Gas Association.

B. C. Electric Power and Gas Co. formed as holding company for B. C. Electric Railway and affiliated companies.

Hammer-Bray Co., Oakland manufacturers of Spark gas range, begin construction of Los Angeles plant.

Colorado-Wyoming Gas Co. lays line to Cheyenne, Wyo. for distribution by Cheyenne Light, Fuel and Power Co.

Waterless gas holder of 10,000,000 cubic feet capacity planned for construction in Los Angeles by Southern California Gas Co.

F. M. Banks made sales supervisor for Southern California Gas Co.

Portland Gas and Coke Co. and affiliated companies begin construction of new Public Service Building.

Home Service department inaugurated by American Gas Association; Miss A. Dean Dowell director.

MEMPHIS' SOUTHERN NATURAL

THE MISSISSIPPI, SEEN FROM A STEAMBOAT-TWIN BRIDGES IN BACKGROUND

MEMPHIS SKYLINE, FROM THE RIVER

KILLIN' TIME IN THE MEMPHIS SUNSHINE

MEMPHIS MUSEUM OF NATURAL HISTORY

STERICK BLDG., IN WHICH MEMPHIS NATURAL GAS CO. HEADQUARTERS

COL. TONKIN

UNDER the Tonkin-Moeller direction a full staff of Southern Colonels has been mustered into service for the duration of the Natural Gas Department's engagement at Memphis, Tennessee—May 6-9. Strictest orders have been issued that every visiting natural gas man receive his proper share of the Old South's justly famed hospitality.

Department officers and committees have combined with Memphis host companies—Memphis Power and

COL. BRENNAN

COL. WINTER

COL. COOPER

COL. HENDEE

CONVENTION BACKGROUND

Memphis will be in carnival dress during A. G. A. Natural Gas Department convention dates. From May 6 through May 11 the Memphis Cotton Carnival will be under way, featuring a National Cotton Show, and numerous carnival balls and pageants. Some of the attractions of this southern center are suggested in picture on these pages: Hotel Peabody, natural gas headquarters, is seen in the foreground of the air view on the page opposite. Convention entertainment plans will make full use of the ideal Memphis setting.

WELCOME AWAITS GAS MEN

Light, and Memphis Natural Gas—to offer the industry a natural gas convention which will take a worthy place in the long tradition of Natural Gas Department and the earlier Natural Gas Association annual meetings.

Momentous issues are down for discussion; new and successful competitive methods of Southern companies will be reviewed; technical progress in the natural gas industry will have its usual large place on the program.

COL. MOELLER

COL. O'BRIEN

COL. FORWARD

COL. HIGGINS

MEN OF THE MOMENT:

COL. TONKIN (John B.): Chairman, Natural Gas Department.

COL. MOELLER (Wm., Jr.): Vice-Chairman, Natural Gas Department.

COL. O'BRIEN (W. J.): Chairman General Arrangements Committee.

COL. BRENNAN (J. J.): Chairman, Hotel and Entertainment Committee.

COL. FORWARD (Alexander): Managing Director, American Gas Association.

COL. HIGGINS (A. E.): Secretary, Natural Gas Department.

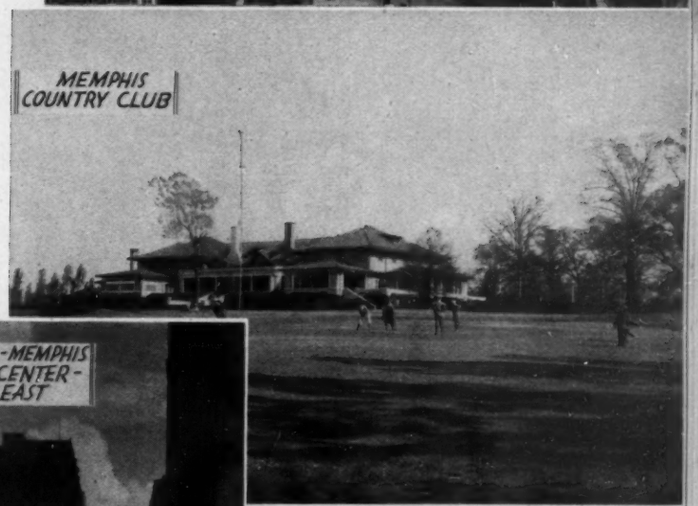
COL. COOPER (H. C.): Chairman, Main Technical and Research Committee, Natural Gas Department.

COL. HENDEE (R. W.); COL. WINTER (W. W.); COL. SCHMIDT (Elmer F.)—Chairmen of various sessions on Memphis convention program.

COL. SCHMIDT

A LAKE IN CHICKASAW GARDENS, MEMPHIS

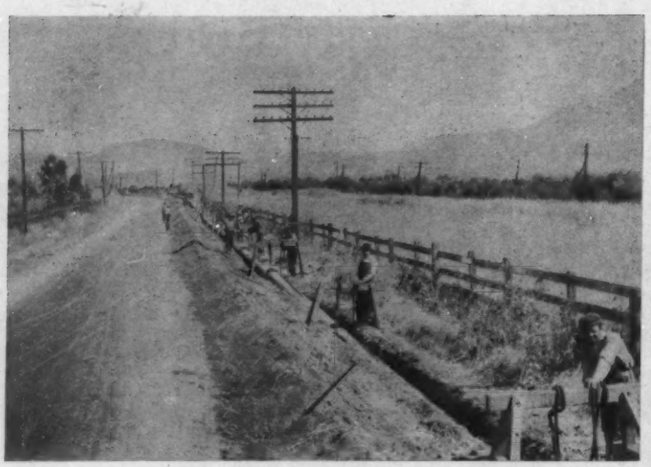
DOWNTOWN MEMPHIS



MEMPHIS COUNTRY CLUB

MADISON AVE.-MEMPHIS FINANCIAL CENTER-LOOKING EAST

LOAD'N COTTON WHERE COTTON IS KING



TWO NATURAL GAS LINES GOING UNDERGROUND—ILLUSTRATING LOWERING METHODS OF YESTERDAY, AND TODAY

PIPELINING . . . *Then* AND *Now*

By B. M. LAULHERE

Supervising Engineer
Southern California Gas Company

IT IS a far cry from the pipe line operations of yesterday, which proceeded either with man power or with teams of horses or mules, to present day pipelining in which, even on comparatively small diameter lines of any length, all operations are carried on whenever possible through the use of power equipment. This has resulted in the loss of much of the color and glamour of the old time pipe line construction jobs and has been brought about to a large extent by a demand for the completion of large projects in a time limit which could not have been met under the old order.

B. M. Laulhere

The writer in the present article will describe some of the developments in construction methods that have followed the continued demand for speed in the completion of large diameter transmission lines. No attempt has been made to cover any of these developments in detail, but rather to give a general picture of rapid changes which have taken place.

The past decade has seen natural gas transported from the large gas and oil fields of the south, southwest and west to the populous centers of the United States. The transmission lines for this purpose were of much larger diameter than had previously been built. Due to the immense volumes transported, higher pressures than had previously been used in such large diameter pipe lines were called for and it became necessary to develop entirely new means of handling the pipe on these jobs.

Millions of dollars were invested in these enterprises, and it is only natural that after the finances for the various projects had been arranged, their backers should be vitally interested in placing the lines in operation. This condition brought about a demand for speedy construction that was unthought of in the previous decade. This haste in construction was not always the most economical procedure, but the orders in most cases were to put the line in operation at the earliest possible date.

In designing a transmission line of large diameter it is essential that all parts of the line may be reached in the minimum of time during emergencies. This has brought about the grading of the right-of-way to a sufficient width to allow the movement of ditchers, welding equipment, caterpillar tractors, trucks, etc., along the route of the pipe line. It is not always possible, due to the topography, to do this, but wherever possible the grade follows the pipe line or very near to it. This work is done far ahead of actual pipe line construction and plays a large part in speeding up operations for the actual pipe laying crews.

In rolling country much of this work can be done with bulldozers, but in rough, mountainous country, steam shovels have been found to be the most economical. It is surprising how much of a rugged right-of-way can be made passable for power equipment by cutting a few feet from the peaks and filling in the valleys.

After the right-of-way has been graded the pipe is strung directly from trucks wherever possible, and snaked in with tractors where it has been impossible to string from the trucks. This method is vastly speedier than the older methods where pipe was strung from wagons hauled by horses or mules, or, where it was impossible to reach the right-of-way, was snaked in with mules or carried by workmen. The use of 40- and 60-foot lengths of pipe, instead of the 20-foot lengths formerly used, has done much to speed up stringing operations.

Ditching operations follow and little need be said of the improvements in ditching equipment. Needless to say, the ditchers for this purpose must be rugged and able to stand a great deal of abuse. In order to maintain the required speed, as much ditch as possible is dug with the machines. When digging uphill on a grade too steep for the ditcher to make under its own power, tractors are used for added power and then used to hold the ditcher back if the downgrade is too steep.

Marked improvements have been made in lining operations. The use of double bell pipe in 40- and 60-foot lengths and the use of centering rings have played an important part in accomplishing the required speed. None of the pipe is handled by hand. In mountainous sections a 60-horsepower caterpillar equipped with a side boom is used for stabbing the pipe, and the beads on the centering rings assure proper spacing of the joints which are tack welded as soon as the

STILL SETTING THE PACE

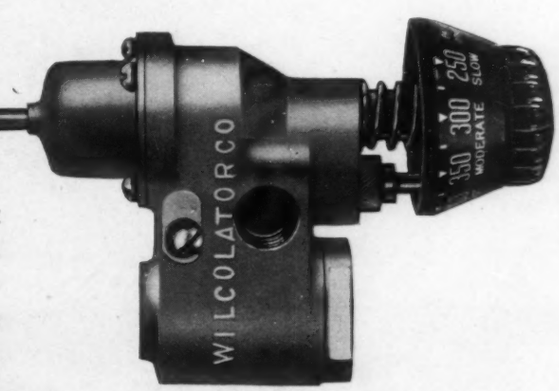
The original liquid-filled type oven heat control was a contribution to the progress of the gas and gas appliance industries, as were the concealed type control, cold calibration and other Wilcolator contributions.

It was the first oven heat control that made available to the gas range industry the following features.

1. Location of dial on manifold cover without use of mechanical transfers.
2. Complete flexibility of thermal element.
3. Elimination of external moving parts.
4. Full compensation for burner box temperatures.
5 Interchangeability between right and left hand ovens and different range types.
6. Low installation cost.

There are hundreds of thousands of M2 Wilcolators now in service, not only on ranges in which quality is emphasized but also on those where ease and low cost of installation is of paramount importance. It is not limited by either requirement.

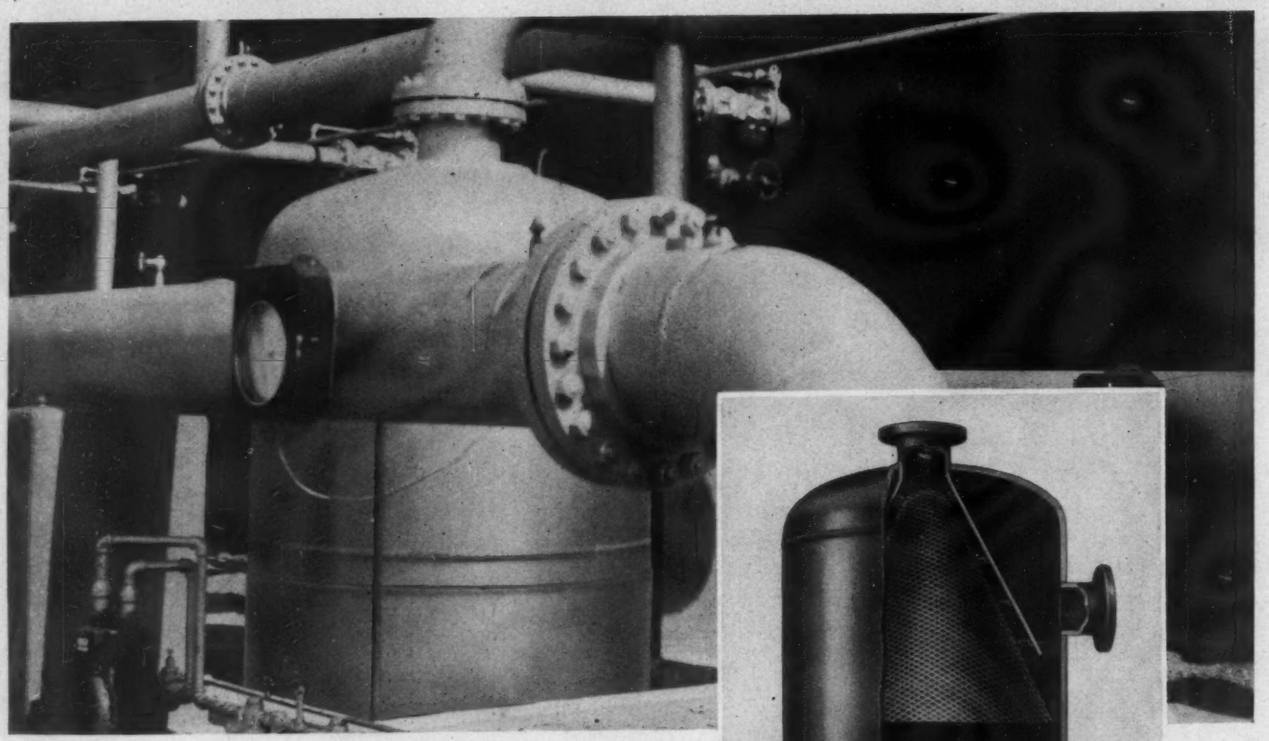
Not until the M2 Wilcolator was proven successful during two years operation was it imitated and thus became the standard by which oven heat controls were judged. It would be progress for you to investigate its advantages.



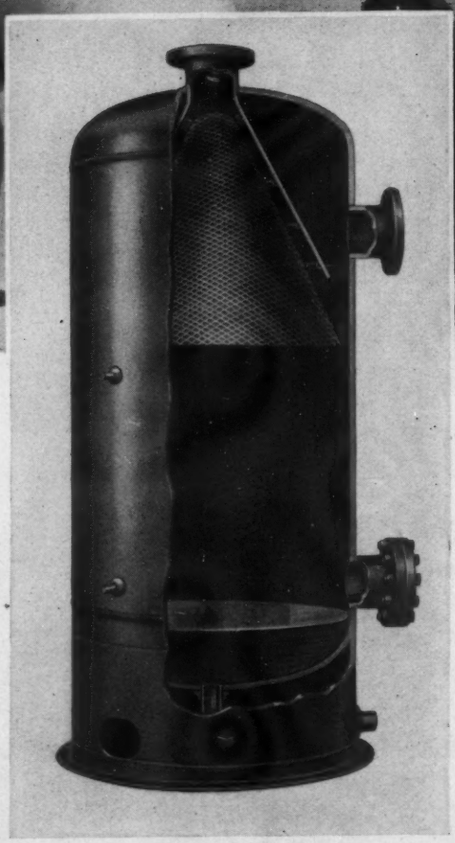
The M2 Wilcolator is so constructed that it has marked appeal to those who sell and service gas ranges. All usual service adjustments are accessible from the front of the range. No disassembly of any part is necessary to make these adjustments convenient.

THE WILCOLATOR COMPANY
Newark New Jersey

FLUOR ANNOU



Fluor Gas Cleaner operating at Kettelman Hills



Cutaway view of the Fluor Gas Cleaner showing its simple, fool-proof design. (Patents applied for.)

Now ready—a gas cleaner offering maximum efficiency,—plus simplicity of design,—which can be installed and maintained at minimum cost.

Test after test shows that the Fluor Cleaner removes 99½% of free moisture carried in the gas stream. The moisture-laden gas enters the top of the cleaner and passes over the mesh-covered steel cone, where moisture collects and drops into the bottom of the cleaner. The gas passes on up and around the cone and out into the line. Efficient performance and simplified operation are thus ideally combined.

This Cleaner is built to handle any specified amount of gas. It is available in two types—for either removing moisture from the gas, or for removing dust. These may be installed singly or as dual purpose units. Send today for a bulletin showing in detail the construction and operation of the Fluor Gas Cleaner.

ENGINEERING & CONSTRUCTION

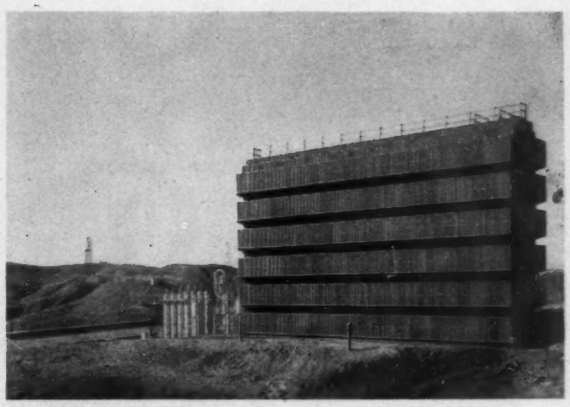
BE SURE WITH FLUOR

NCES A NEW GAS CLEANER

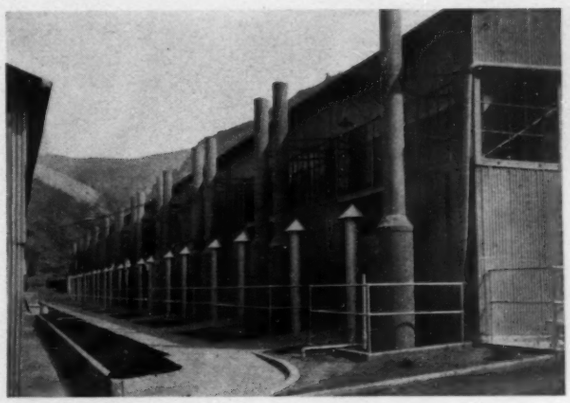
For over four decades the Fluor Corporation has specialized in an engineering and construction service for the oil and gas industries. Where the most modern construction projects are under way,—where installations must be accomplished in minimum time,—where jobs are involved that require the utmost in faithful, conscientious service—there you will find Fluor engineers.

This company has been noted for many years for the manufacture and installation of Aerator Cooling Towers. Equal recognition is given the organization as a complete engineering, construction, appraising, remodeling and maintenance company. It offers to both the oil and gas industries "turn-key" facilities for the design and installation of cooling towers, compressor plants, process plants, lube oil dewaxing plants, and general construction work incidental to the erection of refinery or natural gas plant projects.

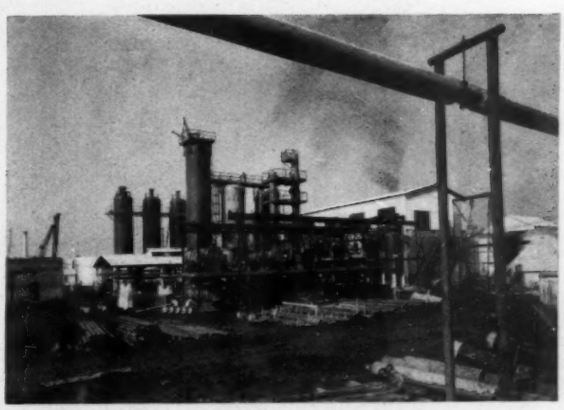
You will find Fluor-built projects are designed and erected by engineers whose creed is not only **how quickly,** but always **how well.** They are proud of their years of steady progress, of its alert research, and of its trained engineers and representatives. The Fluor network of construction service is nation-wide. When you entrust them with the solution of your construction problems, you are gaining the benefit of 44 years' experience, integrity and success.



Recent installation of Fluor Aerator Cooling Tower at Kettleman Hills — 80 ft. long — 12 ft. wide — 50 ft. high.



Battery of 20 Fluor air-cooled mufflers operating on a 760 h.p. gas compressor unit at Ventura.



Construction by Fluor engineers of a lube oil dewaxing plant for a large eastern refiner.

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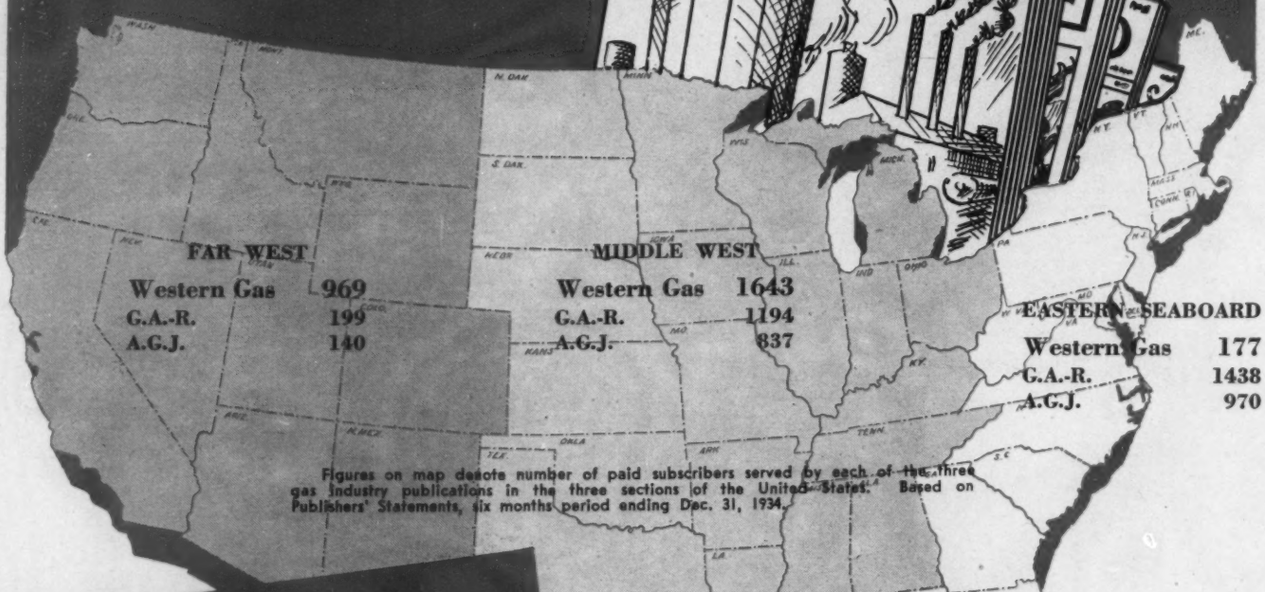
SERVICE FOR THE GAS INDUSTRY

BE SURE WITH FLUOR

GAS INDUSTRY advertisers increased their WESTERN GAS space 35% the first 6 months this year . . . better coverage of the active sections of the industry is one reason.



Figures on map denote number of paid subscribers served by each of the three gas industry publications in the three sections of the United States. Based on Publishers' Statements, six months period ending Dec. 31, 1934.

HERE ARE THE FIGURES
INDIVIDUAL MAIL SUBSCRIBERS

WESTERN GAS	1936*
AMERICAN GAS JOURNAL	1844
GAS AGE-RECORD	1685
NATURAL GAS	709

WE have made this circulation comparison by using only the Individual Mail Subscriptions of each of the gas industry publications. We believe this class of circulation gives the advertiser a truer picture of a publication's value to him. Excluded from the above comparison are all Association subscriptions as well as Mail Subscriptions Special, which classes of circulation are in exactly the same category for the reason that the individual does not have the privilege of personally selecting the publication he receives.

THIS IS PUBLISHED SO THE ADVERTISER MAY KNOW THE FACTS

ATTEMPTS are continually being made by certain publishers to discredit the value of Association subscriptions. In this connection the 800 Association subscriptions carried by WESTERN GAS include the entire membership of the Pacific Coast Gas Association. These individuals number some of the foremost gas engineers and sales executives in our entire industry. They have never had an opportunity to individually subscribe to WESTERN GAS due to the fact that WESTERN GAS has acted as their official organ from its beginning. It is therefore evident that this particular circulation has unquestioned value.

★ Total net paid circulation of WESTERN GAS for six months period ending December, 1934—2862—copies per issue average.

810 S. Spring St. LOS ANGELES **WESTERN GAS** 122 S. Michigan Blvd. CHICAGO

• Hauling pipe on an early gas line project — with "six up" teams.

stabbing is completed. In desert or flat country a truck crane can be used to advantage.

This method contrasts vividly with the old order in which all of these operations were done by man power. The lack of power equipment prohibited the use of joints greater than 20 feet in length except through the use of an excessive amount of man power, and even then the progress would have been tremendously slow.

It is important that the pipe be lined in such a way that as many welds as possible be made as roll welds. For this purpose a grade crew precedes the actual line-up crew and sets skids on which the welding dollies are placed to grade in such a way that when the pipe is lined ready for welding, there will be a maximum of rolling welds. This skid crew plays a very important part in the speed of the work.

The pipe is then lined on the welding dollies as outlined above and after being tacked, is ready for the firing line welders, who do all the roll welding. This new procedure has been made possible due to the use of power equipment, but the high output of the crews together with the power equipment is due to the use of high tensile strength pipe. The great strength has made possible the use of thinner wall pipe than would have been used 10 years ago for the same operating pressures. This decrease in wall thickness results in lighter weight pipe and has played a considerable part in speeding up the stringing, lining, welding and lowering operations.

The tensile strength of the pipe material used in the earlier pipe lines was approximately 55,000 pounds per square inch, whereas the tensile strength of the material used in the large diameter pipe lines recently constructed has averaged from 65,000 to 80,000 pounds per square inch, and in some cases material having a tensile strength of nearly 100,000 pounds per square inch has been used. The difference in the chemical properties of this high tensile strength pipe has resulted in the development of entirely new pipe line welding techniques.

One of the developments that has taken place within recent years and which has also played a large part in the rapidity with which large transmission line projects have been completed, is the use of factory fabricated angles having bell ends. At the point where the line changes direction, all that it is necessary to do is to cut the pipe off square and through the use of one or more of the fabricated angles, any desired angularity, either horizontal or vertical or a combination of both, is easily accomplished.

When this method contrasts with the older method—which involved cutting the joints on a bevel to give the desired angle and trimming and fitting to get the proper space before welding, or making either cold bends or fire bends—it is apparent that the saving in time under the new procedure is a matter of no small importance.

It is safe to say that 10 years ago all transmission pipe line welding was done by the oxy-acetylene process. During the past decade this process, as well as the electric process, has developed to a point that the required speed of welding to keep up with other pipe line operations is easily maintained without the use of an excessive number of welders. Several factors, in addition to the development of the processes, have been responsible for the welding speeds on big transmission projects, among them being the use of 40-foot and even 60-foot lengths, the use of thinner wall pipe, high tensile strength pipe and the reduction in size of the welding vee. The use of the centering ring has also had an important part in speeding up welding operations.

Since one or both of these two welding processes played a part in all large transmission line construction of the past decade, it may be well to consider each of them briefly.

For the electric process gasoline driven generators mounted on wheels are most commonly used. Generators rated as high as 400 to 600 amperes are used for rolling welds, while for tie-in and bell-hole welds, generators rated considerably lower, usually 200 to 300 amperes, are employed. The use of the 400 to 600 ampere machines has made possible the great speed that has been attained on rolling welds. Two beads are made on rolling welds, the first using a small rod usually 1/4 inch in diameter and the second bead using a 5/16- or 3/8-inch rod. The first bead is thoroughly cleaned of oxides and other impurities with wire brushes and descaling tools before the second bead is applied. Tie-in or bell-hole welds are made in the same manner, except that at least three beads are applied, the first 1/8- or 3/16-inch rod and each succeeding bead with a larger diameter rod. Extreme care is taken to thoroughly clean the preceding bead before applying the next. Specially trained pipe line welders are used for the work and this, with the use of high amperage machines, which permit the use of larger diameter coated rod, makes possible the modern welding speed utilizing the electric process.

There has been developed a new process of oxy-acetylene welding which has created considerable interest. This method involves the use of an oxy-acetylene flame containing an excess of acetylene, together with a special rod and a manipulation of rod and flame entirely different from any used in the past. With this combination, the melting of the parent metal is confined to a relatively thin surface along the beveled edge of the pipe; at the same time a weld metal is deposited which is fused with the parent metal. Due to the fluidity of the weld metal, it penetrates to the bottom of the vee.

In making welds with this process, the "back-hand" method of welding is utilized—that is, the flame points back over the completed weld. This has an annealing effect in permitting the slow cooling of the base metal.

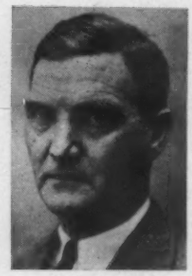
The use of a large flame, the closer spacing and the sharper angle of bevel with the special manipulation of rod

(Continued on Page 84)

Reserve Accrual Problems *in* Natural Gas Rate Cases

By ED. C. CONNOR
Consulting Engineer, Dallas, Texas

THE problems encountered in connection with determining proper reserve accruals are probably the least understood of the many controversial questions that arise when natural gas valuations and rates become subject to legislative or judicial review.



ED. C. CONNOR

The prevalent misconceptions involve all phases of the subject. The exact meaning of the term "depreciation"; the functions of a reserve accrual and its relation to the condition of property; the basis to which the reserve accrual should be applied; the interpretation which should be placed upon existing credit balances disclosed by accounting records; the significance of current charges against existing credit balances as well as the significance of current credits to reserve accounts—are all questions, the answers to which are more or less vague in the consciousness of those vested with legislative authority. It is not surprising that as a result of this condition some orders have been entered and some decisions have been rendered that are more or less grotesque insofar as they relate to the broad subject of depreciation and reserve accruals.

It is unfortunate but nevertheless true that within recent years a number of our regulatory bodies have assumed attitudes so definitely hostile to public utilities in general that it is difficult to determine whether the trend of their orders has been inspired by these attitudes, or by a failure to fully understand the issues involved. Neglecting the punitive attitude of this group and confining the discussion to commissions which have maintained judicial attitudes, it may be stated that the failure of these commissions, as well as some of the judiciary, to arrive at rational conclusions relative to these highly complicated problems can be traced directly to a failure on the part of the companies affected to make a rational presentation of these phases of their own cases. Considering the relative importance of determining proper annual reserve accruals in fixing rates, it is remarkable that so few reliable data are tendered in support of the testimony offered in this connection. It is equally remarkable that the companies should leave both commissions and courts in such obvious confusion relative to certain elementary phases of a subject of such vital importance.

Within the limited scope of a discussion of this character, it is clearly impracticable to analyze in detail any mode of procedure or preparation which would eliminate misconceptions and correspondingly strengthen claims for adequate reserve accruals in natural gas rate cases. In the final analysis, the details of each presentation should be based upon the individual characteristics of the property involved. It is certain that no general rules can be laid down which will apply with any degree of accuracy to natural gas pipe line properties variously located and operated under substantially different conditions. In no other type of public utility property is there such a wide range of diversity in the mortality characteristics of a major property item, such as exists in the case of underground steel pipe of natural gas pipe lines.

Despite these obvious limitations, it is felt that some benefits may be derived from a brief development of some of the basic factors which should control reserve accruals in general, together with some specific suggestions relative to the accumulation and presentation of data concerning the determination of the condition and the mortality characteristics of steel pipe. It is with this thought in mind that the subsequent text has been prepared.

DEPRECIATION AND RESERVE ACCRUALS—A DEFINITION AND A DISTINCTION

Depreciation is a condition which exists in a property at a given time. It may be measured at a specific time by the loss in value that has accrued by reason of the action of the elements, the passage of time, wear and tear, rust and decay, realized inadequacy, realized obsolescence, and other less important factors that contribute to the dissipation and abandonment of property. It may or may not be reflected in a corresponding loss in service value. If this loss in physical value is correctly determined, expressed as a percentage of value new and deducted from 100 per cent, the residual percentage represents that which is generally termed "per cent of new condition."

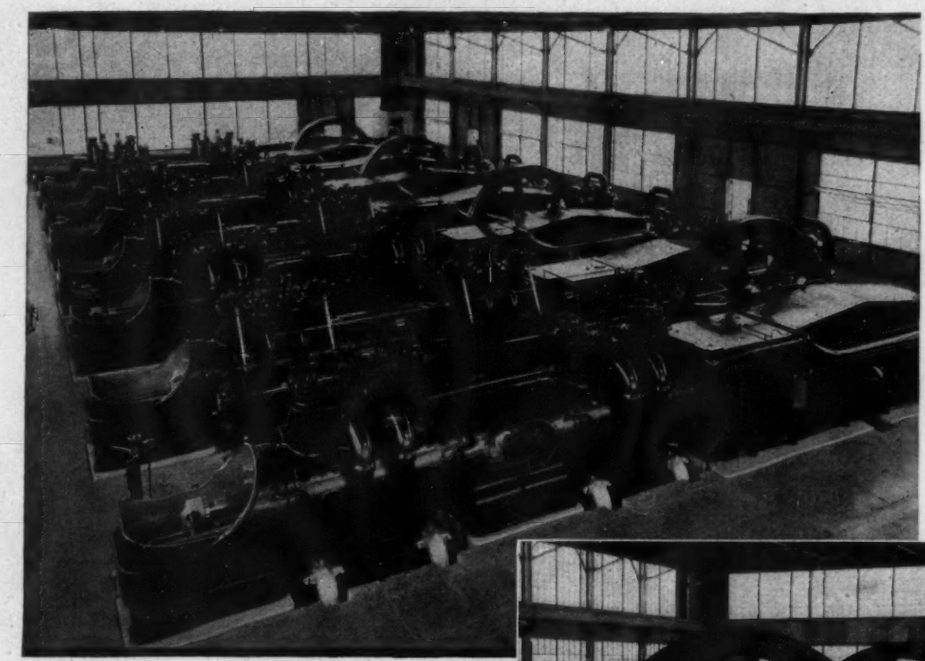
There is a tendency to confuse depreciation as above defined with annual reserve accruals designed in part to provide for costs and losses that are realized when depreciation becomes complete and the property unit involved is removed, replaced, or abandoned. Depreciation, as noted, is a condition existing in a given property at a given time. A reserve accrual in the final analysis is a sum of money set aside annually for the purpose of providing for the cost of specific items and for losses incurred by reason of changed operating conditions. Depreciation exists despite the use of a reserve accrual to offset the effect of its ravages. Reserves may or may not be accrued. In any event the amount which should be accrued is a matter of estimate which should be based upon an intimate knowledge of the specific property and the service conditions under which it operates. Depreciation is inevitable, as certain as death and taxes, and its extent, unlike the father of Roderick Random, is a matter of fact and not a matter of speculation.

As the age of a well maintained property increases, the existing depreciation which has increased with the passage of time, will tend to become stabilized as the result of concurrent charges to the reserve accrual and maintenance expenditures. The point of stabilization will represent an economic balance between the rate of replacements and the efficient operating condition of the property.

If a comparatively old property is augmented by heavy net additions, this new property will have the effect of substantially reducing the depreciation which previously existed, when the amount of this depreciation is expressed as a percentage of the property as a

Again . . .

SOUTHERN NATURAL GAS BUYS WORTHINGTON ENGINES



for **NEW FIELD STATION** *at* **PERRYVILLE, LOUISIANA**

FORD, BACON & DAVIS, Inc.
Designing and Supervising Engineers

●

FOUR 1300 hp. 24 x 36 TWIN TANDEM COMPRESSORS

. . . a total of 16,000 hp. *to date*

●

Additional advanced features of these new engines are:

- Variable speed governor permits speed variation of 30% to 100%
- Smoother operation from new ignition distributors
- Enclosed cams . . . force-feed lubrication
- Clearance pockets permit most economical operation through wide pressure range
- Separate mixing valves for each end of each cylinder, with micrometer-adjusted gas valves . . . assure smooth operation at low speeds and balanced loading of all power cylinders

WORTHINGTON PUMP AND MACHINERY CORPORATION

General Offices: **HARRISON, NEW JERSEY** - *Branch Offices or Representatives in Principal Cities throughout the World*

NRA CODE A-3542

WORTHINGTON

ATLANTA BOSTON BUFFALO CHICAGO CINCINNATI CLEVELAND DALLAS DENVER DETROIT EL PASO HOUSTON KANSAS CITY LOS ANGELES NEW ORLEANS NEW YORK PHILADELPHIA PITTSBURGH ST. LOUIS ST. PAUL SAN FRANCISCO SEATTLE TULSA WASHINGTON

whole. A situation of this kind is found in the history of all companies which have passed through periods of substantial expansion. Under these conditions the fact that there has been an actual decline in the amount of depreciation when expressed as a percentage of the property in service, in no way affects the necessity for the uniform accrual of reserves commensurate with the increased liability for future replacements created by the increase in property units. There is, therefore, no fixed relation between the rate at which depreciation may increase and a proper annual reserve accrual required for the cost of replacements, removals and abandonments in property units subject to depreciation. Depreciation when expressed as a percentage of the property in service may increase, may remain static, or may actually decrease during the progressive stages of an operating experience. The liability for replacements remains unchanged.

In the broadest sense, a reserve accrual should consist of a uniform charge against operating revenues for the purpose of providing funds with which to meet the impact of the increasing and fluctuating costs of the replacement, removal, and abandonment of capital items used in the service. If the property under consideration is extremely old and its component parts consist of a large number of diversified units each of which is relatively small compared to the property as a whole, the normal functions of a reserve accrual may be substantially restricted. A situation of this kind, however, is not encountered in natural gas pipe line systems at the present time.

FUNCTIONS OF A RESERVE ACCRUAL

More specifically and with particular reference to natural gas pipe line companies engaged in a determination of rates and charges for services, a reserve accrual should be designed to provide for the following items:

1. The current and future costs of replacements, removals and abandonments in the particular units of property in service at the date of inquiry.

2. The amortization of the property as a whole upon the basis of the total life of the component parts of the property.

3. The recovery of the value of producing leaseholds and recovery equipment upon the basis of units withdrawn if this element of capital loss is not otherwise provided for by means of current charges to operation.

In each case there should be a clear line of demarcation between the functions of the reserve accrual and the functions of direct operating charges. The exact basis upon which the dividing line between reserve charges and maintenance charges is determined is relatively unimportant provided it is consistently adhered to.

That portion of the total annual accrual designed to provide for the cost of the replacements of units of property such as joints of pipe in pipe lines, should have its basis in actuarial data relative to the behavior of steel pipe under the conditions encountered in the property under consideration. This simple statement lays the predicate for the discussion of an extremely important phase of the subject which will be subsequently developed in some detail. Suffice it to say at this point that any determination which may be made for this factor must necessarily be developed as a percentage of the number of units in service reflecting an average rate of occurrences projected into the future, while the corresponding portion of the total annual reserve accrual must be expressed in dollars reflecting the cost of these occurrences.

BASE TO WHICH THE RESERVE ACCRUAL PERCENTAGE SHOULD BE APPLIED

It should be emphasized that a reserve accrual should be charged with the cost of replacements rather than with the historical cost of the reproduction cost of the units replaced. The cost of replacements should include the cost of the labor, materials and overheads involved in the transaction as well as the cost of recovery when material is recovered. The sum of these costs should be credited with the salvable value of any material recovery.

The cost involved in making piecemeal replacements or relatively small groups of property units substantially exceeds the original cost of installation or the corresponding unit cost developed by a reproduction cost estimate. The reasons supporting this statement are obvious. In practically every case the units replaced represent only a small proportion of the total units; for example, the replacement of corroded joints of pipe in a pipe line. On work of this kind none of the economies of wholesale construction can be applied. In most instances service must be maintained pending the replacement. The material used may not be purchased in sufficient quantities to secure maximum discounts. These and other factors that readily suggest themselves, contribute to the comparatively high cost of work done under these conditions.

It is not sound practice to capitalize this excess cost, as this practice will tend to bring about a divergence between current book cost, original cost and reproduction cost. The question of the salvable value of material that may be recovered in no way affects the principle involved. The reserve should be credited with the net salvage, and a corresponding charge made against the account into which the salvaged material finally finds its way.

It should also be emphasized that a reserve accrual designed in part to provide for the replacement of property units such as joints of pipe in a given line should be based upon some rational conclusions relative to the probable rate at which these replacements will be required in the future. If it is assumed that such a determination has been made, and expressed as a per cent of the units in service, this percentage when applied will result in a figure which should represent the average number of replacements including replacements of replacements as well as the replacement of original units that will be required annually to maintain the group installation at 100 per cent of the units originally installed.

If this per cent per annum is applied to the reproduction cost of a line, the annual sum resulting from this application will result in an adequate reserve accrual only if the cost of the replacements, unit basis, coincide with the unit cost developed by the reproduction cost estimate. If it should be applied to the historic cost of the line, ultimate coincidence between accruals and charges can be realized only when the cost of replacements, unit basis, coincide with the unit cost historically incurred.

If these conclusions are correctly drawn, it is evident that insofar as that portion of the total reserve accrual which is set aside annually to provide for the cost of recurring replacements in property groups is concerned, the annual sum should be fixed by the estimated average rate per annum of the replacements and the estimated unit costs of these replacements. This being true, the method of valuation used in the inquiry becomes immaterial.

In practically every natural gas rate case a divergence of opinion arises as to how undistributed general costs, including interest during construction, should be treated with respect to the application of reserve percentages. It has been a more or less general practice to apply to these items a weighted per cent derived from the several per cents applied to the property groups found in the direct structural costs, and by this method fix an annual sum for the reserve accrual applicable to general costs. This method has been followed in practically every case where there has been a reduction in the value of general costs by reason of the accrued depreciation found in the property as a whole.

That the use of this method is an evidence of careless thinking can be readily demonstrated. Certainly if the pro-

LINE PIPE at its best!

Beyond all question, the seamless process of making line pipe results in a finished product superior to that made by any other method. Pierced and rolled from a solid billet, with no longitudinal line of weakness to impair, to affect it, or even to permit a doubt as to the integrity of the whole and the full strength of every part—a section of Seamless Pipe is a balanced and perfect unit.

Used in many of the most important oil, gas, and gasoline lines in the country, including the Great Lakes, Continental, Columbia, Atlantic, Keystone, and Sun lines, NATIONAL Seamless Line Pipe is serving under a wide variety of conditions, many of which impose unrelenting tests, and in every way it has proved thoroughly reliable.

Made by the largest manufacturer of Seamless Pipe in the world—NATIONAL Seamless is available in a complete range of sizes and wall-thicknesses for any line-pipe requirement. On any problem concerning the use of pipe, the research and field service staffs of National Tube Company will gladly give advice. Communications addressed to any District Sales Office will receive prompt and careful attention.

ADVANTAGES

1. *Seamless—no welds.*
2. *High tensile strength.*
3. *Exceptional uniformity.*
4. *Unusual ductility.*
5. *Adaptable to any type of joint.*
6. *Less interruption to service.*
7. *Lower laying costs.*
8. *Longer lengths.*
9. *Tight joints and less joints per mile.*
10. *A product of the largest manufacturer of tubular products in the world.*

NATIONAL TUBE COMPANY · Pittsburgh, Pa.

Pacific Coast Distributors—COLUMBIA STEEL CO., San Francisco, Calif.

Export Distributors—UNITED STATES STEEL PRODUCTS CO., New York, N. Y.

United States Steel Corporation Subsidiary

NATIONAL SEAMLESS

PIERCED FROM SOLID BILLETS - NO WELDS

ANOTHER GREAT ADVANCE IN

OVER 500 miles of pipe line has been Lindewelded with the new Multi-Flame Lindewelding Head since the first of the year—and every mile is operating successfully today.

What It Is—And Does

Essentially, Multi-Flame Lindewelding involves three factors—the Multi-Flame Lindewelding Head; a special flame adjustment (employing a backhand technique exclusively); and a special welding rod. The Multi-Flame Lindewelding Head consists of a special chromium plated tip that has three flames: the main welding flame, and two auxiliary smaller flames located about 1¼-in. from the end of the tip. These two smaller flames preheat both edges of the vee ahead of the point of welding. An excess acetylene flame carburizes the base metal surfaces just ahead of the advancing puddle. The special welding rod perfected for Multi-Flame Lindewelding insures the highest physical properties in the weld metal. The combination of these three factors has resulted in greater speed and economy in the production of pipe welds over previous methods.

Used By Men Who Know

Over one hundred experienced pipe line operators have already used the new Multi-Flame Lindewelding Head on hundreds of miles of pipe line. The strongest proof of their unqualified acceptance is found conclusively in the fact that the new Multi-Flame Lindewelding Head, which had its inception in the mid-continent field, has entirely superseded the single flame for all Lindewelding of pipe lines in that territory.

Proved Under Actual Conditions

In the heart of the mid-continent field, under the most adverse and grueling operating conditions, Multi-Flame Lindewelding literally went through a baptism of fire and emerged a perfected and accomplished technique. Here, this modern technique was tested, improved and rigidly retested with but one objective—to fill the industry's demand and need for more speed and economy in consistently producing good welds.

Saves Time, Rods and Gases

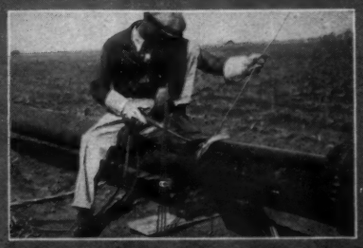
The enthusiastic acceptance of Multi-Flame Lindewelding by pipe line companies and contractors is due to its outstandingly greater speed, economy and ease of operation. It meets all field welding conditions, any size pipe, and wall thickness, jammed joints, excessive spacing, and high-low line-ups. Yet, important as these advantages are, the dominant fact is that with *the new Multi-Flame Lindewelding Head and the proper technique,* the average pipe line operator can effect *savings ranging from 15 to 40 per cent in welding time, rods and gases.*

Linde Process Service Cooperates

There need be no hesitancy in adopting Multi-Flame Lindewelding on your pipe lines. If you use Linde Oxygen, Linde Process Service Operators will help you organize your welding operations to secure the greater speed, efficiency and economy now possible with Multi-Flame Lindewelding. The development of Multi-Flame Lindewelding has conformed with the non-compromising standards set by Linde engineers since oxy-acetylene welding was first adopted for pipe lines. Standards that automatically require the work of development to be carried on in both the laboratory *and under actual operating conditions in the field.*

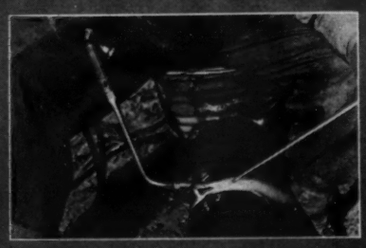
Lindewelding Performance Told in Pictures

RECORD RIVER CROSSING—With Multi-Flame Lindewelding this 8-in. line was laid across a river in one day—a notable record.



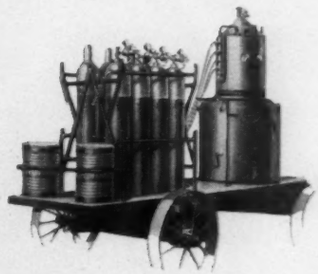
TIME IS MONEY—With Multi-Flame Lindewelding a saving of 25 per cent in welding time was made on this 10-in. pipe line.

89 WELDS PER MAN DAY—On a stretch of 8-in. line a record of 89 welds per man day was achieved by men with little previous experience with Multi-Flame Lindewelding.



FIFTY PER CENT INCREASE IN PRODUCTION was achieved on this 8-in. line. Six men averaged 304.6 welds per day with Multi-Flame Lindewelding.

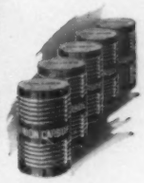
You can order everything for Pipe Line Welding from Linde



LINDE OXYGEN... available in any amount from plants and warehouse stocks in all industrial centers.

PREST-O-LITE ACETYLENE ... ready to use—the standard dissolved acetylene for well over a quarter of a century.

OXWELD APPARATUS AND SUPPLIES ... Oxweld offers the maximum value in oxy-acetylene equipment. Blowpipes, regulators, acetylene generators, welding rods, and supplies—are available for every welding and cutting operation. Complete stocks and service stations are located in all principal cities.



UNION CARBIDE... sold in the familiar Blue and Grey drum from over 250 warehouse stocks.

PIPE LINE CONSTRUCTION

Contact the Nearest Sales Office

The nearest Linde Sales Office will be glad to furnish complete information on Multi-Flame Lindewelding and the cooperation extended by Linde Process Service. Offices are located at Atlanta — Baltimore, Birmingham, Boston, Buffalo, Butte—Chicago, Cleveland—Dallas, Denver, Detroit—El Paso—Houston—Indianapolis—Kansas City—Los Angeles—Memphis, Milwaukee, Minneapolis—New Orleans, New York—Philadelphia, Phoenix, Pittsburgh, Portland, Ore.—St. Louis, Salt Lake City, San Francisco, Seattle, Spokane and Tulsa.

Everything for oxy-acetylene welding and cutting—including Linde Oxygen, Prest-O-Lite Acetylene, Union Carbide and Oxweld Apparatus and Supplies—is available from Linde through producing plants and warehouse stocks in all industrial centers.

PRODUCTS OF A UNIT OF UCC UNION CARBIDE AND CARBON CORPORATION

The Linde Air Products Company

Unit of Union Carbide and Carbon Corporation

NRA CODE

UCC

In Canada: Dominion Oxygen Co., Ltd., Toronto

PERFORMANCE TELLS THE STORY

FIFTY Per Cent Increase in Production was possible with Multi-Flame Lindewelding on a line of 30 miles of 6-in. pipe with $\frac{5}{16}$-in. wall, and 24 miles of 8-in. pipe with $\frac{1}{4}$-in. wall. Multi-Flame Lindewelding was not available until after 14 miles of the 8-in. line had been welded. The remaining 10 miles of the 8-in. line was completed in three more days with Multi-Flame Lindewelding. This resulted in an average of 304.6 welds per day for six men which represented 50 per cent increase in production with no increase in personnel. Test welds were cut from the lines and given the reverse bend test. No welds failed in this test. This marked increase in production made the use of Multi-Flame Lindewelding on the longer 6-in. section a matter of course. The pipe was in 40-ft. lengths with 37½ deg. bevel. On this part of the line the six men averaged nine welds each per hr., or an average altogether of 4 miles per day in spite of sand and long moves. The line tested with 100-lb. air pressure proved absolutely tight.

Cross River in One Day. Another 8-in. line gives some further comparative data. The pipe lengths averaged 18 ft. and the weight of the pipe was 24 lb. per foot. The pipe in this case was from an old line and had been reclaimed by means of a pipe-cutting machine. Six welding operators were employed, four using the ordinary single flame blowpipe while two used the new Multi-Flame Lindewelding Head. The latter two attained a speed of 50 welds each per day, the former making but 40 welds each, or an increase of 25 per cent for Multi-Flame Lindewelding. One interesting section of this particular job was a 1500 ft. river crossing. By using special construction methods and Multi-Flame Lindewelding, the crossing was made in one day, a notable record.

Record of 89 Welds per Man Day. A prominent contractor of the mid-continent field has installed a number of lines with Multi-Flame Lindewelding. In one instance 30 miles of new 12-in. pipe were laid in 11 days. Considerable delay was experienced due to the nature of the country and river detours, so that several days were not worked full time. The six men on the firing line were averaging 30 or more welds a day even with these handicaps, and one day averaged 36.5. On a stretch of 8-in. pipe the same men averaged as high as 48 welds each per day, and on 6-in. pipe a record of 89 welds per man day was attained. Both 6-in. pipe and 8-in. pipe were $\frac{13}{32}$-in. wall thickness, second-hand and beveled by a blowpipe cut. None of these welders had had much previous experience with Multi-Flame Lindewelding.

Saves 25 Per Cent in Welding Time. Still another contractor has been doing considerable work on 10-in. pipe of $\frac{13}{32}$-in. wall thickness. On a 42-mile line laying new pipe in 40-ft. sections an average of approximately 38 welds per man day was obtained. There were four men on the firing line, each working on a string of five 40-ft. sections. The record made on this line with Multi-Flame Lindewelding represented a saving of 25 per cent in welding time over the older single flame tip.

perty as a whole is subject to amortization, then the adopted amortization rate should apply to all of the property including general costs. In most instances, however, an amortization accrual is calculated upon a sinking fund basis and constitutes a relatively small part of the total annual per cent set up. It likewise is true that if a further decline in value will be suffered by the general costs, and a further deduction made from a rate base at any future time by reason of this fact, this contingent loss in capital value should also be provided for. If an analysis is made it will be found that a substantial amount of the estimated annual reserve accrual is designed to provide for the inevitable increase in the rate of the replacement of units of physical property. The question to be answered is to what extent will general costs be incurred in connection with these piece-meal replacements of property units. Take for example the item of interest during construction. In a properly prepared reproduction cost estimate of any large property this item is a very substantial one and varies from 6 to 9 per cent of the total sum of the estimate. In the replacement of property units upon a piece-meal basis, this item of cost will not be proportionately incurred, and the same statement applies in a lesser degree to all the other items designated as undistributed general costs. It follows, therefore, that an annual reserve accrual expressed as a percentage and applied, in a manner designed to provide for certain costs should not be applied to specific items, the cost of which will not be proportionately incurred when the replacements are made. The situation here presented is exactly the opposite from that encountered when a per cent per annum representing the probable rate of occurrences is applied to direct structural costs. In the latter case the direct structural costs of piece-meal replacements will be substantially in excess of the unit cost of the same items in any accepted basis of valuation. In the former case the undistributed general costs encountered in piece-meal replacements will be substantially less than these same costs developed by any proper method of valuation.

This phase of the subject has by no means been covered by this discussion, but enough has been said to indicate that a reserve accrual should be determined by a careful study of what it is designed to do and the average annual sum required for this purpose. In the final analysis, this annual sum has no particular relation to the manner in which the rate base has been determined. Custom and convenience have suggested that it be expressed as a percentage of the value, or cost of the property subject to depreciation and amortization. If the amount of the annual sum required is the result of an independent engineering investigation, as it should be, any increase or decrease in the rate base by reason of the method valuation employed should merely result in a corresponding decrease or increase in the percentage applied to the rate base.

RESERVE ACCRUALS AND THE CONDITION OF PROPERTY

One of the stock arguments advanced by legislative authority in justification of the scaling down of reserve allowances is the fact that the percentage of loss in value determined by observation divided by the age of the property in every case results in a percentage substantially less than that claimed for reserve accruals. The fallacies behind this contention are obvious; nevertheless, in some cases it has been seriously advanced by members of superior courts.

In the first place, what is the age of a given property? Certainly it could be the total period of operation only if each and every unit of property in service at the date of inquiry had been installed at the very beginning of operation. The actual age of a property composed of large numbers of individual units can only be determined by a careful analysis of the installation date of each unit, the relation of each unit to the property as a whole, and the extent of replacements and abandonments. A number of the major railroad systems of the United States have been in operation for more than 70 years, yet it is doubtful if a single unit of property originally installed remains in service today.

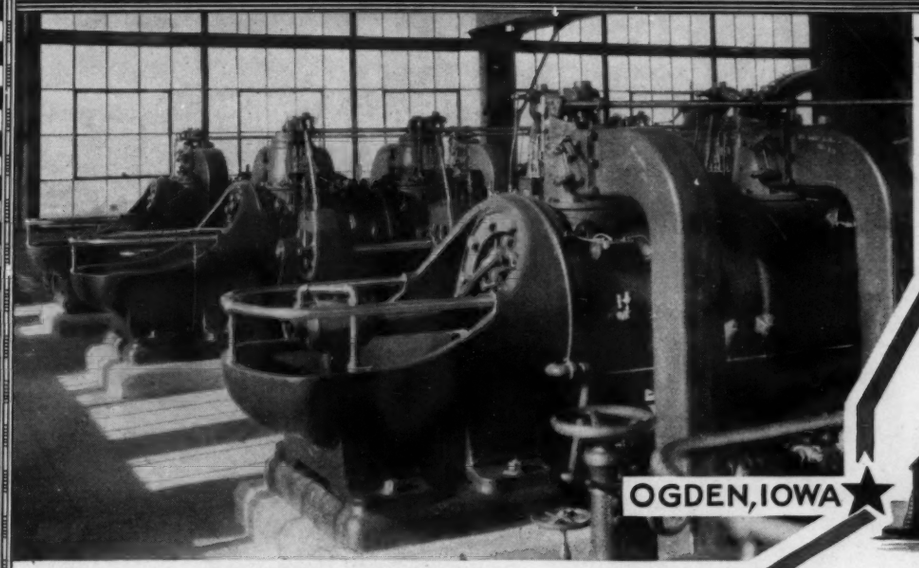
The error in the premises, however, lies deeper than a mere failure to properly interpret the factor of age and this statement applies with particular emphasis to natural gas pipe line properties.

The functions of a reserve accrual required for natural gas pipe line properties comprehend the provision of the money required for the cost of replacements, removals and abandonments of property items from all causes as well as for the cost of liquidation upon the final abandonment of the enterprise. That portion of the total annual accrual set up to provide for losses and costs arising from physical failure and realized inadequacy is the only portion of the total accrual that bears any relation to the per cent of new condition determined by observation. The removal and abandonment of property units brought about by changed operating conditions create a very substantial part of the total charges against the reserve account of any natural gas pipe line property and corresponding accruals must be set up to meet these certain and recurring costs. A physical inspection of a property at a given time certainly could not take into consideration the probability of such occurrences in the determination of per cent conditions any more than could an examination of the buildings in large cities give effect to the fact that as a certainty some of these buildings would be destroyed by fire during the ensuing year. The portion of the total accrual designed to provide for losses on final liquidation should be accrued upon a sinking fund basis which fact effectually eliminates any reduction in current value by reason of what may be termed accrued amortization.

It has been pointed out previously that normally there is a substantial difference between the unit cost of replacements and the unit costs of the identical items found in any valuation. That portion of the total accrual designed to provide for replacements due to failure from physical causes must be sufficient to meet the cost of these replacements. This fact in itself has a decided tendency to create a divergence between the rate of decline in per cent condition, and that portion of the reserve accrual designed to provide for the costs arising from physical failure. This fact, however, is not as important as a condition that grows out of the characteristics of the failure in the major property units formed in natural gas systems.

In practically every natural gas pipe line system steel pipe laid underground constitutes by far the major portion of the total investment. It can be readily demonstrated that by reason of the variable effects of local external conditions which control the service life of steel pipe from the standpoint of corrosion, that no definite relation exists between average life of the original units of steel pipe in a given line, and the annual rate of the replacement of this pipe. It can also be demonstrated as a corollary to this proposition that there is no definite relation between the per cent of new condition of this pipe and the annual rate at which replacements will be required to maintain 100 per cent of the units of service. As an example, on any given line the areas of high corrosive intensity are usually restricted to more or less limited sections of the line. The rate of replacement in these particular sections will be extremely high compared to the rate of replacement in the other sections of the line and the replacements themselves will have a decided tendency to follow the behavior of the units replaced; thus perpetuating the chain of occurrences. In this example, which is a typical one, the rate of replacement will be substantially in excess of the annual decline in per cent condition for the reason that a very substantial proportion of the entire line may be practically perfect despite the fact that

(Continued on Page 64)

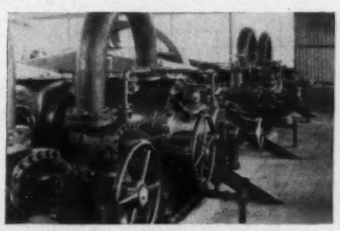


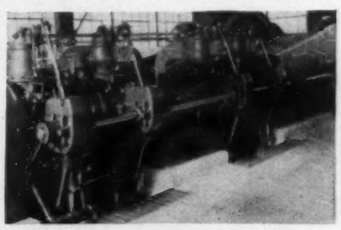
NORTHERN NATURAL *Chooses* COOPER-BESSEMERS *for the* INDUSTRY'S LATEST COMPRESSOR STATION

A natural gas pipe line 1800 miles long is quite a pipe line. Modern Cooper-Bessemer units power three of the main line compressor stations on this high pressure line of the Northern Natural Gas Company. The station at Skellytown, Texas with 3000 H. P. The station at Clifton, Kansas with 3000 H. P. *And now the newest main line station in the entire gas industry*—OGDEN, IOWA with 1600 H. P.

Skellytown and Clifton compressor stations were built in 1930 and have had ample opportunity to prove their efficiency and reliability. The Highly significant fact is that Northern Natural has again chosen Cooper-Bessemer engines for both the main and auxiliary power in their latest compressor station.

Two modern Cooper-Bessemer compressor units rated 800 H. P. each, in Northern Natural Gas Company's new compressor station at Ogden, Iowa. Units are twin-tandem, double-acting Type-19's.





THE COOPER-BESSEMER CORPORATION

640 East 61st St. . . . Los Angeles, California

25 W. 43rd St. New York City — Mills Bldg. Washington, D. C. — 225 Crockett St. Shreveport, La. — 201 East First St. Tulsa, Oklahoma — Magnolia Bldg. Dallas, Texas — Esperson Bldg. Houston, Texas

Mount Vernon, Ohio — PLANTS — Grove City, Pennsylvania

FIG. 1

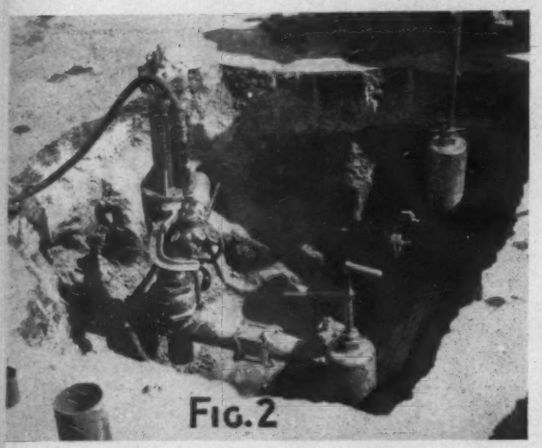


FIG. 2

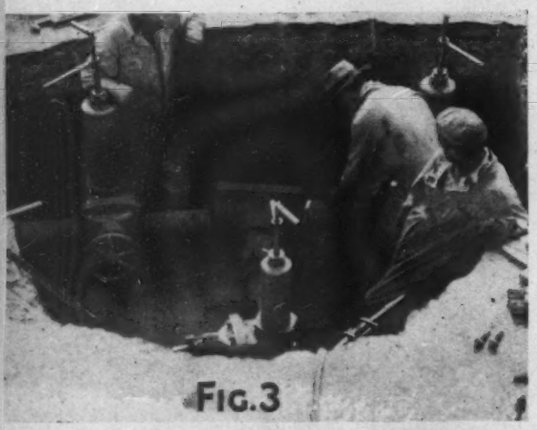


FIG. 3

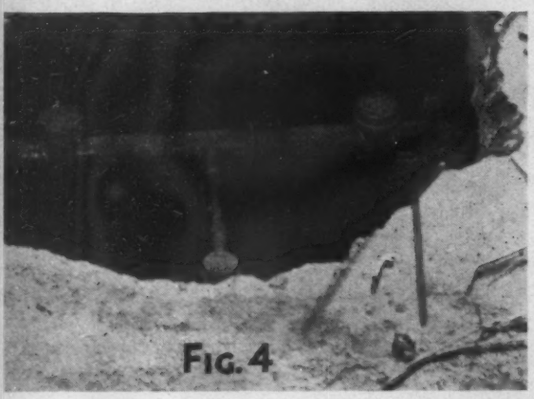


FIG. 4

FIG. 1. Beveling sides of pressure control fitting for welding.

FIG. 2. Pneumatic tapping machine, drilling pressure control fitting.

FIG. 3. Using torch to cut out old fittings. High pressure gas was shut off with three pressure control fittings.

FIG. 4. The completed job. Two 6-inch pressure control fittings and one 4-inch.

A *Pressure Control and Extension Fitting for pipe lines*

By W. M. HENDERSON

Superintendent Gas Distribution
*Los Angeles Gas and Electric Corporation**

TO repair a pipe conveying a fluid, such as gas, oil, steam, or water, or to make replacements or extensions, it is frequently necessary to control the pressure. On high pressure gas this is usually accomplished by effecting a shutdown by means of the nearest valves. Rarely are such valves conveniently located for purposes of the shut-down; consequently, large sections of the line must be rendered inoperative by disposing of the pipe's contents before work may be performed. Seldom, in such cases where shut-down may be arranged, will the line-valves produce a tight shut-down. In many cases, particularly on gas distribution or water systems, the shut-down means considerable inconvenience to consumers, and necessitates individual notice before and after service is restored.

On low pressure gas lines the repair is usually accomplished by the installing of bags or stoppers; however, to accomplish this it is necessary to work in the presence of escaping gas with its accompanying hazards.

For branch line extensions, or branch tie-in, it is equally desirable to control the pressure. This is commonly done by either installing a saddle, or welding a fitting to the mainline, to which a gate-valve is connected. The mainline is then tapped through the gate-valve, and the extension connection made with the valve closed. After this operation, the valve seldom has further use.

To avoid the inconvenience associated with shutting down a pipeline, to reduce the cost of such work, and eliminate any danger in performing these jobs, the Pressure Control Fitting is offered as a solution. In a modified form, it is available for making extensions from lines under pressure without the permanent installation of a valve or other type of shut-off, and without interfering with the line pressure.

The fittings are fabricated from steel or cast iron, and are welded in place or mounted on the pipe as a split-fitting with wedge or bolts.

A set of tools is required for each size fitting. These consist of stuffing box, gate valve, expansion plug, and plug wrench. Any standard tapping machine may be adapted to use with the fitting.

W. M. Henderson

The photographs illustrate the application of the Pressure Control Fitting, as well as use of the tools.

The design and principle of the Pressure Control and Extension Fittings is such that they insure a positive shut-off. The fittings need not be installed until the occasion directs, and then at the exact location desired. They cost from one-fourth to one-third (depending on size) of the price of a gate-valve. The fittings are always effective; if left in the pipe line for a long period, and the "well" becomes filled with pipe scale or other deposits, this may be easily removed by inserting, through the stuffing box and gland, a pipe with serrated edge, and allowing the line pressure to blow the foreign matter to the atmosphere.

A very useful application of the Pressure Control Fitting is found in the replacement of a section of line by using a by-pass. In this respect, a few experiments will better illustrate their service:

Palm Springs, Calif., is a very popular desert resort, with a winter population of 2,500 or more. That community is served by 125 miles of 4-inch line, with a pressure of 125 pounds. The line terminates at Palm Springs. Enroute it crosses a large wash on a highway bridge. Last winter the State Highway Department proceeded to replace the bridge with a new concrete structure. To remove the line would mean a shut-down, as there was no valve on the line below the bridge. *(Turn to Page 44)*

*This discussion gives the substance of an illustrated paper, presented by the author before the 12th Annual A.G.A. Distribution Conference, held May 2-4, at Cleveland, Ohio. The pressure control fitting described was developed under the supervision of the author, by Allan Larry of the Los Angeles Gas and Electric Corp. distribution department.—*Editor.*

The New

PAYNE "FAU" FURNACE

(Forced Air Unit Type)
(Requires No Basement)

For Small Home Modernization

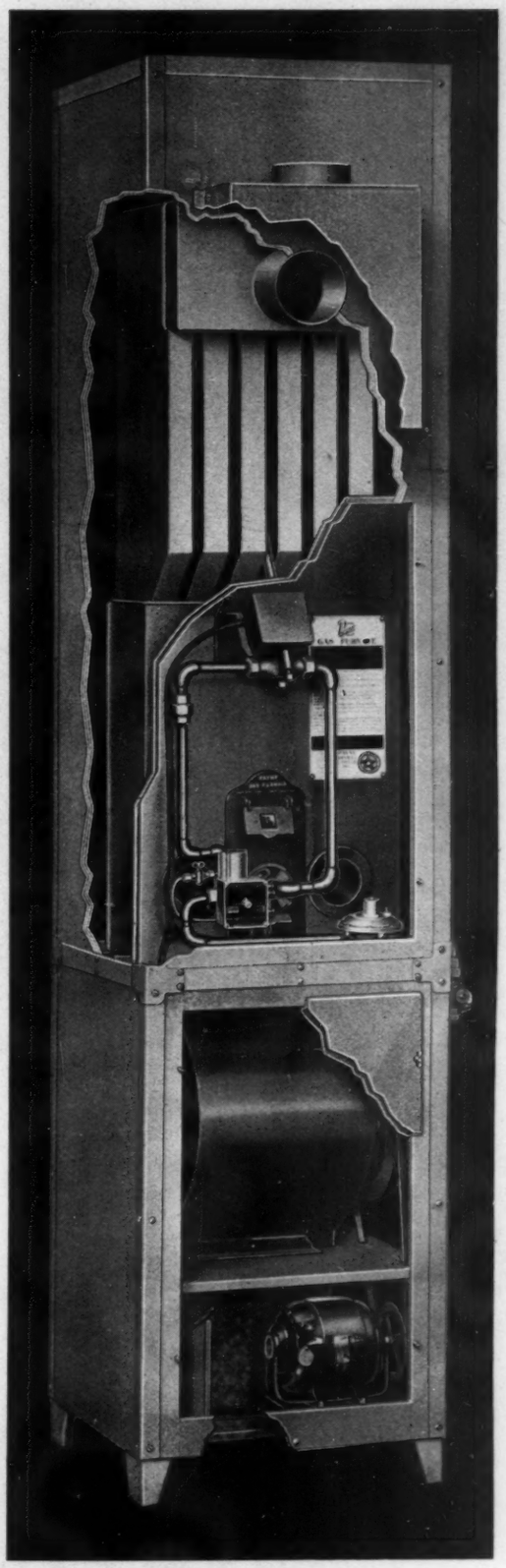
■ The Payne "FAU" Furnace marks the greatest step in the progress toward perfection in warm air heating and summer cooling. This unit offers to the small home owner all the advantages of a complete forced air heating system with the added feature of summer cooling and ventilation, at moderate first cost and assurance of efficient and economic operation.

COMPACT: The Payne "FAU" Furnace contains complete heating unit, blower, gas pressure regulator and all control equipment under one casing, which occupies no more space than the average modern water heater. Can be placed on back porch.

EFFICIENT: A maximum of radiation surface, free air passage and proper insulation combine to make this unit exceptionally efficient and economical. No heat units are lost. No gas fumes are permitted to enter the warmed air which heats the rooms.

HEALTHFUL: Air supply is taken from outside. Due to slight pressure produced by blower equipment, perfect circulation results, making the air in the heated rooms healthful and vitalizing. In summer the air may be circulated and cooled without opening windows and doors.

ATTRACTIVE: The casing for the Payne "FAU" Furnace is finished in Milan green enamel, a neutral shade which combines readily with decorative schemes and makes the unit extremely attractive.



SALES CAMPAIGN RESULTS

The quality of the products you offer to the consumer determine the success of your Sales Campaigns. For continuous load and thoroughly satisfied customers select Payne Heating Equipment. Help your customers Modernize their homes with Payne "FAU" Furnaces.

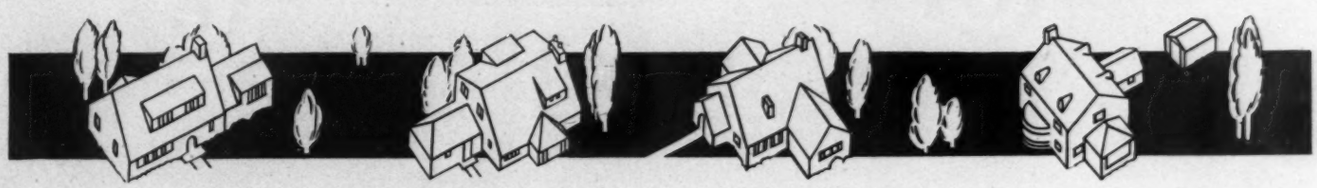
METAL-BESTOS GAS VENT AND FLUE PIPE

This aluminum lined and insulated vent pipe is now universally accepted as the very best venting material for gas burning appliances. It is laboratory tested and approved and by actual installations has been proved to have indefinite life.

Write for descriptive literature

PAYNE FURNACE & SUPPLY CO.

Beverly Hills • California



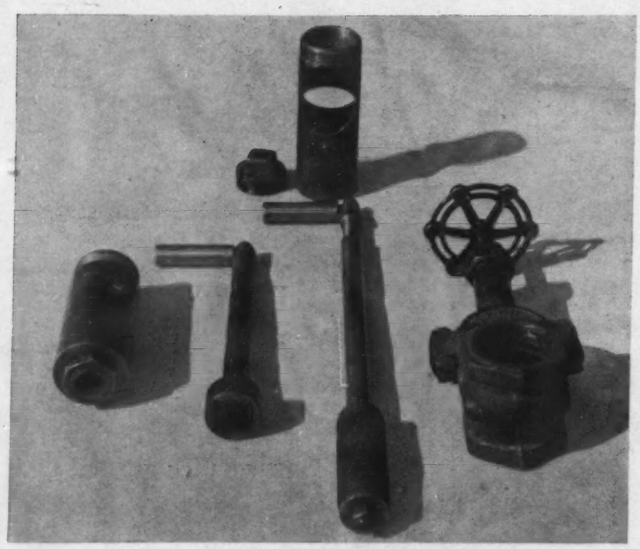


FIG. 5. Two-inch pressure control tools, and 2-inch pressure control fittings (at rear).

The Pressure Fitting is designed for just such jobs. A fitting was welded onto the pipeline above and below the bridge. An Extension Fitting was welded to the line above the upper "pressure control fitting" and below the lower "control fitting." A by-pass of 2-inch pipe was run across the bed of the wash and connected to the Extension Fittings. The line was then drilled and the plugs were set in the Pressure Fittings, and the line on the bridge was removed. Later, after the bridge was completed, the line was replaced and tied at each end to the Pressure Control Fittings, and the by-pass removed, leaving the two 4-inch Pressure Control Fittings and the two 2-inch Extension Fittings in place. This work was all performed without any interruption of service or reduction of line pressure.

Another excellent example illustrating the utility and economy of the Fittings occurred where a short piece of main was to be removed from the flow-line of a large storm drain. This was in a suburban section of the City of Los Angeles. A single line of 3-inch high pressure pipe served a number of blocks containing 197 consumers. This was the sole source of supply; to cut out the section would mean the interruption of supply to all these consumers, necessitating notification both before and afterward. The cost of such notice, turning the meters off and on, and relighting pilots would represent at least $197, to say nothing of the inconvenience to the consumers.

The installation of the pressure control fittings adjacent to the work, and the Extension Fittings to install a short by-pass allowed the line to be cut and relocated without interruption of service or reduction of pressure.

Frequently line valves at intersections are found leaking, or impossible to operate to get an effective shut-down. In such cases the pressure control fittings are installed ahead of the valves, on each side, and the line pressure shut off. (Where the supply is from both directions, no by-pass is required.) The valves are then removed. The same procedure is followed to remove old leaking fittings.

Both types of Fittings may be made in any size, limited only to the size of shell drill available. For speed and convenience, air-powered drills are used on sizes 2-inch and up, although hand drilling may be done.

Time required for installation, welding fitting in place, and drilling, is shown below:

Pipe Size	*Welding*	*Drilling*
1 in.	10 min.	6 min.
2 in.	15 min.	20 min.
4 in.	35 min.	20 min.
6 in.	60 min.	30 min.

The welding of the Extension Fitting, and drilling of main line, require but half the time listed, as but one weld is necessary, and one cut.

As of April 1st, over 1,300 installations have been made in a period of 2 years. Use for these fittings is increasing on the system of the Los Angeles Gas and Electric Corp. Valves or plug cocks are installed only where there is frequent occasion to operate. The fittings are recorded, as installed, on the distribution maps by a symbol, as it may be desirable to make future use of same.

These fittings represent two years of development, and their utility, simplicity, and absolute safety are now apparent. They eliminate the reduction of pressure, or the shut-down of the pipeline to perform work. Thus, interruption of service to a consumer or a section of the distribution system is avoided. Their cost is low, and usually a big saving in other indirect expenses results from their use. The installation and operation are simple, and the time necessary to install the fitting is less than the preparation required to effect a shut-down on the line. The general use of the fittings on main and service work eliminates all need of exposing the workmen to escaping gas (except in cases of leaks and line breaks), and this removes one of the hazards now present in distribution of gas.

Gillespie Heads Public Relations For No. Ind. Public Service Co.

PROMOTION of F. S. Gillespie to the position of manager of industrial relations has been announced by Dean H. Mitchell, vice-president and general manager of Northern Illinois Public Service Co. Mr. Gillespie succeeds James M. Brodbeck, who has resigned.

F. S. Gillespie

Before promotion to his present position, Mr. Gillespie had charge of disbursements and stores accounting in the general offices of the company. He has been with the Northern Indiana Public Service Co. since 1924. Prior to that time, he was employed in the general office of the Central Illinois Public Service Co. in Springfield, and left that utility to become supervisor of the payroll department of the Northern Indiana Public Service Co.

Born on a cattle ranch near Springer, N. Mex., Mr. Gillespie attended grade and high schools in New Mexico, and later attended the New Mexico College of Agriculture and Mechanical Arts. He attended the University of Illinois and was graduated with a degree of B.S.

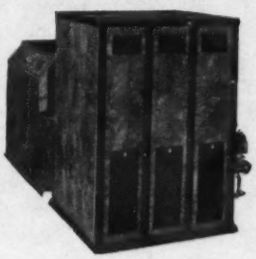
Morrison National Representative Of Pittsburgh Equitable Meter

C. C. Morrison has been appointed national representative of the Pittsburgh Equitable Meter Co. and its subsidiary, Merco Nordstrom Valve Co. Mr. Morrison formerly was president of the Pennsylvania Pump Co. of Pittsburgh, Pa., and for many years had been associated with manufacturers of measuring equipment. He is a graduate of the University of Michigan.

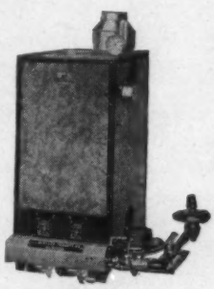
Natural Gas Tax Bill Killed

Minnesota House File No. 652, a bill to tax natural gas 5 cents per M c.f., was killed by 16 to 9 in the house taxes committee after several weeks of consideration.

THE BIGGEST NAME IN GAS HEATING



Gas Furnaces—
Steel or Cast



Gas Boilers—
Steam and Water

Climator Systems
Air Conditioning Units
—in a complete range of
styles, sizes, and prices.

Indications point to the biggest year since 'way-back-when in Gas Heating.

Have you the line and the plan to make the most of the opportunities FHA opens to you?

In the Complete Mueller Line you have every type of gas fired heating equipment — backed by the biggest name in gas heating, MUELLER GAS-ERA, a name that means Quality to the customer.

Any investigation will show you that Mueller-Milwaukee is the volume line.

Write for the facts in full — let's "turn on the GAS" for a Big 1935!

L. J. MUELLER FURNACE CO.

Dept. WG-5, Milwaukee

Branches and Distributors in Key Cities Everywhere

MUELLER – MILWAUKEE

THOSE HIGH BILL COMPLAINTS

and a few essentials in high bill investigation procedure

By H. T. EAST

Assistant to Vice-President, Public Service Company of Northern Illinois (Chairman, Customer Relations Committee, American Gas Association)*

THE value to the industry of an established reputation for good service and fair dealing is so readily apparent that it can safely be assumed that every gas company is genuinely anxious to please its customers to the fullest possible extent. Since displeased customers usually make their attitude toward the company known by registering complaints the methods employed by complaint handlers is a matter of major importance. The attention given complaint handling in recent years has brought decided improvements in technique and has led to the elimination of many complaint causes. Since it is a foregone conclusion that gas companies will always have complaints from their patrons it will avail us little to analyze the mental processes of the conditions which prompt complaints, but we can and should constantly check all policies and procedures which involve irritated customers if we are to hold our gains and make still greater progress.

H. T. East

The subject of high bill complaint handling has not been neglected. Much has been written concerning it and committees of the industry are constantly studying the subject. Too often the writings which appear are statements of generalities with much repetition of long recognized and accepted facts. The problem has changed but little because human nature has not changed and, further, because no great headway has as yet been made in the matter of educating customers concerning the intricacies of the business of producing, distributing, measuring and billing the gaseous energy which they use. There are no short cuts or cure-alls and there are few, if any, new ideas which can be advanced to revolutionize the art of satisfying the dissatisfied customer, but experienced observers contend that despite the wishes of executives and all the efforts made to improve complaint handling the individuals who actually handle these delicate contacts do not always make full use of the knowledge or experience gained in this work. A comprehensive review of what to do when handling bill complaints and a list of specific things to look for during an investigation on the customer's premises should be useful to employees entrusted with this important work.

Successful complaint handling is only possible when company representatives have a proper attitude toward their company and their job. The man who, recognizing the importance of his work to the company, goes about his task with the thought of helping the customer understand and be on friendly terms with his company is bound to accomplish more than the man who is merely holding down his job, content to get each case out of his way in any manner that will not cause him any further trouble or criticism. One who does not see in every contact an opportunity to help his company and resolve to make the most of it lacks something which the ideal complaint man must have. One who recognizes that he is in reality working for the customers whose need for gas service makes his job possible will subconsciously concentrate his faculties upon the task of pleasing the individuals whom he contacts. A proper attitude toward the company and the job is essential.

When a complaint is received care must be taken to preserve the customer's point of view or contention for use as a guide in its handling. Real danger lies in arbitrarily assuming that a complaint is due to a condition other than that claimed by the customer. After all, the objective is not simply that of correcting the condition but of satisfying the customer. The job is only half done when the error is corrected or cause removed unless the customer has also been convinced that his complaint has been disposed of properly. In fact, conditions would be bad for a gas company which never received any justified complaints whatsoever, if its customers continued to imagine that things were wrong.

If complaints are received by pleasant mannered employees who carefully and sympathetically discuss the customer's problem a start has already been made toward satisfying them. A cold, skeptical clerk who listens to the customer's story with a bored expression helps confirm the belief that the company does not care and will make no very great effort to find something wrong. Voice and manner can do much to convince the customer that we are interested and genuinely anxious to help him. The fact that a customer has gone to the trouble to report his complaint proves that he is in earnest in his beliefs and he can rightly feel indignant if his complaint is treated lightly. Even where a customer is obviously wrong he should not be told so directly but rather be led to see the correct conclusion. This procedure can be made very effective.

After the complaint is recorded on a suitable form it should be referred promptly to a field investigator. Personal calls on all high bill complaints have so many advantages over other procedures that the plan of an account analysis followed by letter reporting conclusions reached must be classed as a very poor substitute. An investigation on the premises personalizes the company and provides a means of disposing of questions or correcting conditions in addition to those which prompted the complaint. Letters merely answer the points which the dictator believes the customer has in mind and they frequently raise other questions and may even raise other points to argue about. A letter stating that the company is not at fault confirms the suspicion of the skeptic, antagonizes the

*Readers of *Western Gas* will recall with pleasure Mr. East's article—"C.R.C.—A Customer Relations Code for the Gas Industry"—published in the February, 1935 issue.—*Editor.*

CRADLE CIRCULATION

and BUILT-IN THERMO-CONTROL

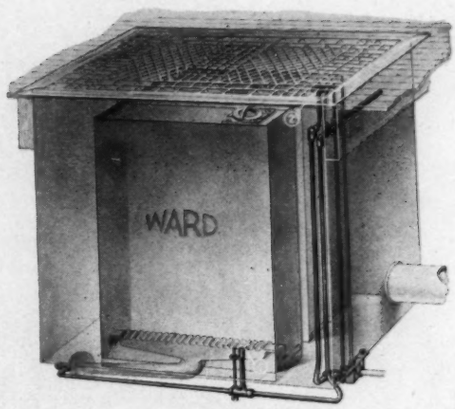
• featured this year on all •

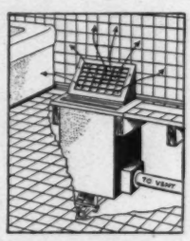
WARD FLOOR FURNACES

THESE improvements, now standard on all Ward floor furnaces, make for greater efficiency, safety and comfort.

CRADLE CIRCULATION the most epoch making improvement in floor furnace construction within recent years, increases air circulation from 10 to 15 per cent. Bilt-in Thermo-Control assures a uniform temperature at all times, just set indicator for desired temperature and forget it. Thermo-Control will do the rest.

As always, Ward floor furnaces have the same high standard of workmanship, material and beauty. They are built to last. The finest Toncan iron is used throughout, and in our experience Ward floor furnaces have given perfect service for twenty years. There is a Ward for every heating requirement, from bathrooms to public halls. Write for literature and full information.





WALL-HE-TOR

The Wall-He-Tor is the latest member of the Ward Floor Furnace family. Designed primarily for bathrooms, it is ideal for breakfast rooms, small bedrooms and dens. For a half a cent an hour it will make any small space comfortable and cozy.

Ward Basement Furnaces

Ward Basement Furnaces are made of heavy rust-resisting copper alloyed iron in sizes for every type of home. Like all other Ward products, they are equipped with the most modern safety appliances and carry the famous Ward 10 year guarantee.

WARD HEATER COMPANY

Established 1909

1800 W. Washington Blvd. Los Angeles, Calif. Telephone PArkway 9171

SPECIALISTS IN FLOOR FURNACE MANUFACTURING FOR 26 YEARS

dissatisfied person, and does no more than agree with the customer whose complaint was justified. Personal calls not only dispose of complaints better and more quickly but offer a contact that can be made a big factor in selling the company and its service to the user.

Although the nature of each complaint will largely determine the procedure to be followed in its handling, every possible cause or explanation of a bill increase must be investigated carefully. Where there is nothing actually wrong the best way to convince the customer that everything is in order is to let him observe you making a conscientious effort to find a cause for the increase. No single investigation would involve every item mentioned but a complete investigation should at least check all the following possibilities.

1. Meter Reading

The tin or cast iron box which the gas company installs in the home for the admitted purpose of determining the amount of the monthly bill is blamed by many customers for bills which they believe to be high. All investigations on the premises should start at the meter. Some of the mystery surrounding the meter can be dispelled by inviting the customer to go to the meter with you and look it over. After a brief description of the device and instruction as to how to read it, the customer, better acquainted, no longer views it with suspicion. Once the customer learns that the gas meter operation is much like measuring a quantity of water by simply dipping it out in gallon buckets and adding up the number of buckets emptied into the barrel to determine the total amount measured he will likely have more confidence in its future operation. An eager readiness to describe the meter and explain its operation and how to read it is convincing proof that there are no mysterious meter secrets.

2. Meter Accuracy

It is natural for lay persons to question the accuracy of the meter when bills are received which they consider to be too high. Meters are seldom to blame and every opportunity to build confidence in these devices should be utilized. In discussing meters always emphasize the fact that modern meters are very accurate instruments, developed by years of research, and that they are manufactured by reliable manufacturers whose business success depends upon producing instruments of sustained accuracy. Customers should know that gas meters have proved their reliability to a point where many state and municipal regulatory authorities require them to be tested only once every six or seven years.

The fact that all the gas meter mechanism is inclosed in an air tight metal box which cannot be opened except in the shop should also be stressed. Customers who know this will no longer fear that meter readers possibly might have moved the index hands so as to cause higher readings.

3. Inside Piping and Laundry Cocks

Relatively few complaints are due to inside piping except in those instances where more than one meter is located in the same building. In checking complaints in multi-family buildings the piping should be checked insofar as possible to make sure that the complaining customer's meter does not measure the usage of other occupants. Where several customers use a common laundry it is not unusual to have an arrangement whereby one laundry plate can be supplied through any one of several meters. Provisions are made to lock off each outlet but many customers neglect to avail themselves of this protection. Any unlocked laundry cock means that some neighbor when using the laundry may innocently use gas which will later be billed to another. Certain combinations of valve turnings may even permit gas being diverted through one neighbor's meter to another's range. All these possibilities should be checked by the conscientious and painstaking complaint investigator.

4. Constant Registration

"My meter never stops" is a common form of complaint and those who utter it are nearly always sincere in their belief. Once it is explained that gas meters are motivated solely by the gas they measure, and that they cannot possibly register unless gas is passing through them into the house piping, we have shown that a gas meter cannot "creep." Constant registration is usually due to pilot lights or leaks and where this is found to be the case we should demonstrate to the customer that this actually is the cause.

5. Pilot Lights

The pilot light has become a part of many modern gas appliances. Pilots have been improved until they are very economical and efficient but they still require some gas and most types must burn continuously to serve their purpose. Pilots which are set too high cause a waste of gas which should be corrected. Some companies provide their investigators with statistical tables showing the average requirements of various types of pilots in cubic feet per hour so that each pilot may be checked by timing the test hand for a fixed period. A trained investigator can tell at a glance whether the pilot frame is adjusted higher than necessary.

Oil and gas burning furnaces and boilers have pilots which burn gas. An improper setting of a fixed pilot or wrong adjustment on a pilot of the expanding type may easily account for the increase complained of. Watch your pilots.

6. New Appliances

It is a curious fact that high bill complaints are sometimes accounted for by an increase in requirements due to newly acquired appliances. Not infrequently complainants can be satisfied by merely directing their attention to the new device. Before criticizing this seemingly incredible situation of a customer not realizing that more appliances mean more gas used remember that appliance salesmen sell their wares by emphasizing the service they will give or their economy, not by stressing the amount of gas they will use. Customers may have forgotten the new addition or somehow never believed it would use enough gas to increase the monthly statement. Exceptional diplomacy and tact should be used when handling complaints of this nature in order to avoid creating distrust of the new device. Comments regarding the comfort or convenience made possible by the appliance are helpful here.

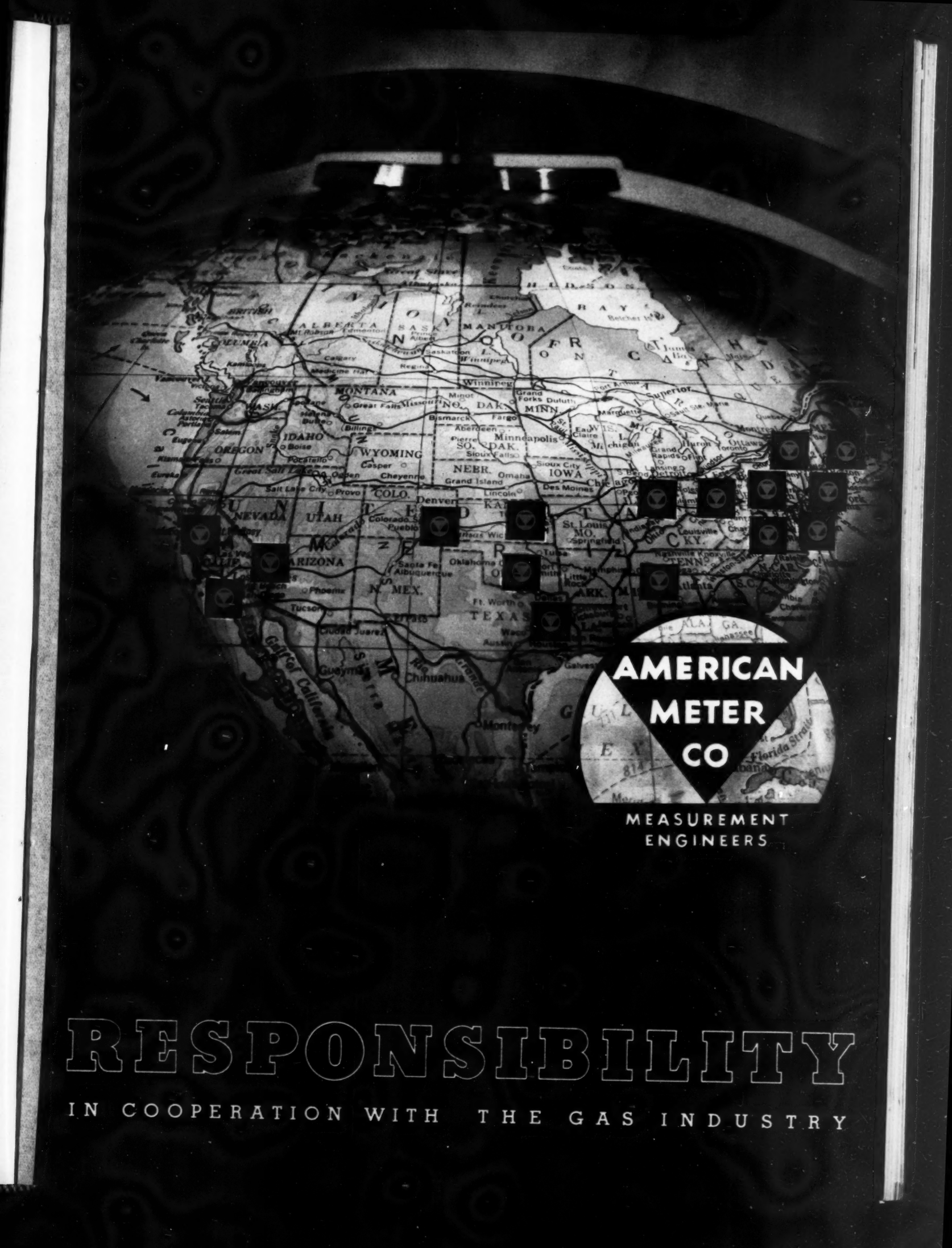
7. Refrigerators

The number of gas operated refrigerators is increasing very rapidly. Despite their low operating costs they do cause some increase in the monthly bills which may prompt complaints. The best procedure is to point out that in making any comparisons with bills rendered before the refrigerator was installed the sums previously paid for ice should be included. This comparison will always favor the new refrigerator. Weather conditions, temperature of location, frequency of opening doors and other factors affect the operating hours of the refrigerator and these must all be analyzed and explained in disposing of complaints which involve such equipment.

8. Water Heaters

Water heaters not only provide the users with a valuable and important service but also are one of the company's best revenue producers. If they do not operate efficiently and economically they may cause the customer to feel unkindly

(Continued on Page 86)



RESPONSIBILITY

IN COOPERATION WITH THE GAS INDUSTRY

AMERICAN McDONALD METRIC MARYLAND PACIFIC
TUFTS WESTCOTT GRIFFIN H & McI RELIANCE

COAST TO COAST

This coast-to-coast organization is dedicated to the progress and stability of the gas industry as an indispensable and responsible public service.

. . . an industry which has progressed only as fast as technical and economic developments within the industry have made its product and its service both available and desirable to the public.

Significantly, the milestones in this progress have been milestones also in the development of increasingly accurate and dependable instruments for the MEASUREMENT of gas.

In cooperation with gas companies American Meter Company has maintained a continuous program of research. Its findings have been made available for the benefit of the entire industry . . . not only in the development and maintenance of increasingly accurate instruments but through the release of the industry's most authentic technical literature on every phase of measurement and standards of accuracy.

As Americans, we subscribe to the basic philosophy of the gas industry that responsible public service and good citizenship are synonymous . . . and that both the industry and the public are best served by the elimination of such a serious check to progress and initiative as government competition.

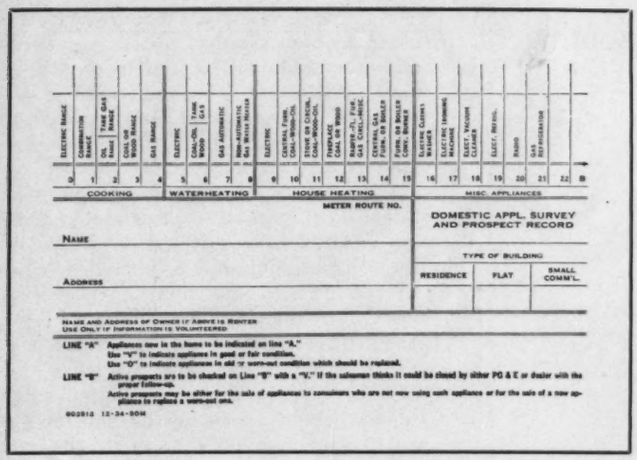
AMERICAN METER COMPANY

INCORPORATED

EST. 1836

MEASUREMENT & CONTROL OF GAS, OIL, STEAM, AIR, LIQUIDS

Albany Alhambra Baltimore Birmingham Boston Chicago Dallas Denver Erie
Kansas City Los Angeles New York Philadelphia Pittsburgh San Francisco Tulsa



DOMESTIC APPL. SURVEY AND PROSPECT RECORD

NAME

ADDRESS

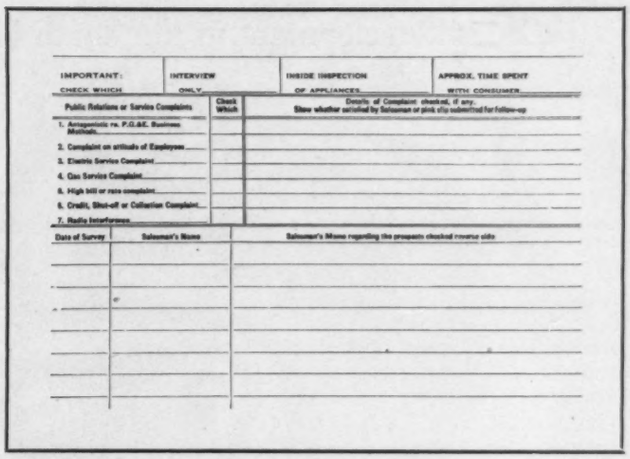
TYPE OF BUILDING: RESIDENCE | FLAT | SMALL COMM'L.

NAME AND ADDRESS OF OWNER IF ABOVE IS RENTER
USE ONLY IF INFORMATION IS VOLUNTEERED

LINE "A" Appliances now in the home to be indicated on line "A."
Use "V" to indicate appliance in good or fair condition.
Use "O" to indicate appliance in old or worn-out condition which should be replaced.

LINE "B" Active prospects are to be checked on Line "B" with a "V." If the salesman thinks it could be closed by either PG & E or dealer with the proper follow-up.
Active prospects may be either for the sale of appliances to consumers who are not now using such appliances or for the sale of a new appliance to replace a worn-out one.

902812 12-34-90M



IMPORTANT: CHECK WHICH | INTERVIEW ONLY | INSIDE INSPECTION OF APPLIANCES | APPROX. TIME SPENT WITH CONSUMER

Public Relations or Service Complaints | Check Which | Details of Complaint checked, if any. Show whether satisfied by Salesman or pink slip submitted for follow-up

1. Antagonistic re. P.G.&E. Business Methods
2. Complaint on attitude of Employee
3. Electric Service Complaint
4. Gas Service Complaint
5. High bill or rate complaint
6. Credit, Shut-off or Collection Complaint
7. Radio Interference

Date of Survey | Salesman's Name | Salesman's Name regarding the prospects checked reverse side

FRONT OF DOMESTIC APPLIANCE SURVEY CARD IS SHOWN AT LEFT; REVERSE SIDE IS SEEN ABOVE.

The P. G. and E.'s

Sales-Service-Survey Program

By F. U. NAYLOR

Manager, Gas Sales
Pacific Gas and Electric Company

IN THE following comments upon the "Sales-Service-Survey" plan now in use by the Pacific Gas and Electric Co., Mr. Naylor has reviewed for *Western Gas* readers the ground covered in his informal report to the Spring Sales Conference of the Pacific Coast Gas Association. The P. G. and E. plan as there described provoked a great deal of interest among other companies, and numerous requests have been received that it be reviewed in *Western Gas.—EDITOR.*

IN 1934 the Pacific Gas and Electric Co. inaugurated what has been termed its "Sales-Service-Survey" program, which involved requiring each of its domestic salesmen to make a minimum of 25 surveys each week. It was estimated that about 1/5 to 1/4 of the salesman's time would go into such survey work within his district, leaving the remainder for sales follow-up on prospects developed through the survey and otherwise.

In addition to his base salary each salesman was paid $20 per month for properly completing the required number of surveys. Approximately 160,000 survey reports were filed in 1934.

So successful was the beginning that the program has been expanded in 1935 to embrace not only the domestic but also all of the commercial, industrial and agricultural gas and electric sales work of the company.

Such an extensive program of customer contact by salesmen calls for careful organization. One item given particular attention was the development of a "purpose talk," so that the salesmen would not make their entry into the homes under false pretenses. Salesmen are trained to make their call effective in the interest of service and public relations as well as for the purpose of inventorying equipment in use and developing of prospects. Conduct of each customer contact is designed to lay a proper foundation for successful sales follow-up.

Reproduced with this article is one of the appliance survey cards being used in the Sales-Service-Survey, for domestic customers. Suitable cards for industrial and agricultural calls are also in use.

As indicated in the illustrated form, information is gathered on appliances or equipment now in use, whether appliances are in good or fair condition or are ready for replacement, and on the competitive fuels utilized by the customer. The reverse side of the form shows the questions bearing upon service complaints and customer attitude toward the company.

Information of the type yielded in the Sales-Service-Survey work is of obvious assistance in obtaining new revenue, retaining competitive markets, and bettering customer relations and service policies.

From the standpoint of field operation of customer surveys, a localized district Sales-Service-Survey plan offers the following advantages:

1. Organized systematic field coverage of customers by meter routes.

2. Locating of customer relations or service complaints including correct operation of appliances, servicing required, rate applications, correct spelling of customer's name, etc. *Example:* Out of 160,000 domestic surveys in 1934, a total of 20,459 consumer relations and service complaints were reported and corrected.

3. Development of prospects for appliance sales, such prospects being followed up for sale direct by the company or allocated to dealers for their sales follow-up.

In addition to the large number of prospects developed for direct sale by the company, the P. G. and E. survey work in 1934 also developed 8,725 prospects that were allocated to dealers from which 643 sales resulted. The ratio is 7½ per cent or one out of every 13.

4. Appliance inventory data resulting in information and potential prospects.

A recapitulation of some of the more important appliance inventory data developed from the P. G. and E.'s survey of 160,000 domestic consumers in 1934 is as follows:

Appliance	Per Cent Usage
Combination ranges	6.9
Oil ranges	.9
Coal and wood ranges	6.7
Gas ranges	83.
Coal, wood or oil water heating	4.2
Gas automatic heaters	38.6
Gas non-automatic heaters	46.7
Coal, wood or oil furnaces	10.1
Coal, wood or oil room heaters	27.2
Gas space heaters including floor furnaces, circulators	28.9
Central gas heating systems, including furnaces and boilers	16.6
Electric clothes washers	41.6
Electric vacuum cleaners	59.
Electric refrigerators	19.
Radios	84.4
Gas refrigerators	.21

The second important use of customer survey data is by sales management and permits of the following:

(Continued on Page 78)

10-Year Development in the South and Southwest

(Continued from Page 19)

without any comparable increase in customers served, the major additions being a 16-inch system from the Quinton field through the Warner field to near Bixby with a tap to Muskogee, a 14- and 16-inch line from Quinton field of Oklahoma to Tulsa, and numerous small lines in the Collinsville, Owassa, Broken Arrow area. During this period Oklahoma Natural also acquired or built, a 16-inch line from the Chickasha field to Oklahoma City, a transmission system from Shawnee through Seminole and the Little River field to Holdenville, an 8-inch system from the Fairview and Bearden fields into Okmulgee. The properties constructed by it into San Angelo, Texas have been disposed of and now constitute the Texas Public Service Corp. During this period Oklahoma Natural also acquired the distribution properties of the Oklahoma Gas and Electric Co. at Ardmore, Healdton, Ringling, Wilson, El Reno, Enid, Muskogee, Norman, Bethany, Britton, Oklahoma City, Yukon, and Shawnee, all in Oklahoma.

The Southern Natural Gas Co. constructed a 22- and 20-inch line from the Monroe and Richland fields of Louisiana across Mississippi and Alabama to Atlanta, Ga., serving numerous towns enroute and in Georgia. Later extensions were a 12- and 10-inch branch to serve Selma and Montgomery, Ala., and Columbus, Ga., and an 18-, 16-, 14- and 12-inch system from Yazoo City, Miss., to Gulfport, Mobile and Pensacola. This Yazoo City to Gulfport, Mobile and Pensacola system was acquired upon completion by United Gas System.

Panhandle Eastern Pipe Line Co.: This system, originally Missouri-Kansas property, extends from the Panhandle of Texas through the Hugoton, Kansas field with 20- and 24-inch pipe and ties into properties of Kentucky Natural Gas and Columbia Gas and Electric in Indiana. A half interest in this property has been acquired by Columbia Gas and Electric.

The Canadian River Gas Co. and *Colorado Interstate Gas Co.* laid a 22- and 20-inch line from the Texas Panhandle to Denver, Colo.

Natural Gas Pipe Line Co. of America: This 24-inch system extends nearly 900 miles from the Panhandle of Texas into the Chicago area. It was made possible by the cooperation of major holders of gas properties in the Texas Panhandle field, who pooled their gas holdings and financed the line in a manner somewhat similar to the Mississippi River Fuel line from the Monroe field to St. Louis. Their Fitch, Texas compressor station contains twelve 1250 h.p. engines.

Northern Natural Gas Co.'s system, originating in the Panhandle Texas field, extends with 20-, 22- and 26-inch lines to Lincoln, Neb.; Sioux Falls, S. D.; Omaha, Council Bluffs, Des Moines, Minneapolis, and St. Paul. This property is owned jointly by Lone Star Gas Corp., United Light and Railways Co., and North American Light and Power.

Empire Gas and Fuel Co. ("Cities Service") laid a 20-inch line from the Panhandle field of Texas to tie into its large system at Wichita, Kan., and later extended this 20-inch line through to Ottawa, Kan., thence with 16-inch to Kansas City, making three 16-inch lines into this point. Other major additions were a 16-inch line from Tallant, Okla. to the Seminole field, a new 12-inch line to Ft. Leavenworth and St. Joseph, Mo., reestablishing natural gas service at the latter, a 20-inch line from Ottawa to Lawrence to increase capacity to the northeast end of the system, a 16-inch line from Lawrence to Topeka, an 8-inch system from Hutchinson, Kansas to Superior, Neb., a 12-inch line from Ottawa, Kan. to Sedalia, Mo., and an 8-inch line to connect Fort Scott, Kan. and Nevada, Mo. into the general system to reinforce failing local supplies. The mileage of transmission mains increased over 60 per cent while customers served increased only about 25 per cent. The company also connected the Oklahoma City pool by a 20-inch line into their main system near Blackwell.

GENERAL TRENDS

Prior to this period steel pipe over 20-inch was a rarity but many of the large systems constructed in or from the area have used 22-, 24- and 26-inch pipe. The distance through which gas is transported increased from 250 or 300 miles to 450 and then past the 1,000-mile figure.

Through the economies effected by a single ownership of both transmission and distribution systems in large properties natural gas service has been made generally available to communities heretofore considered too small to be profitably served. Experience has shown that in many such cases, however, too great a degree of optimism was felt and rate litigation is just as apt to be fomented on the smallest and least profitable distribution system as on the largest, even at identical existing rates.

As rock pressures have declined in the older pools production costs have generally increased and as sources of supply have been found at farther and farther distances from the markets to replace failing fields the costs of transmission have generally increased.

There have been sporadic raidings of established markets of existing systems by competitive promotions. None of these have enjoyed any great degree of prosperity and the fight for business has caused the financial collapse of some of them. In this business as in others the way of the transgressor is hard.

For the first time in the knowledge of the writer, financing of natural gas enterprises was done through the sale of securities to the general public in connection with the Dixie Gulf and Houston Gulf Systems. Such financing has since been done on other systems.

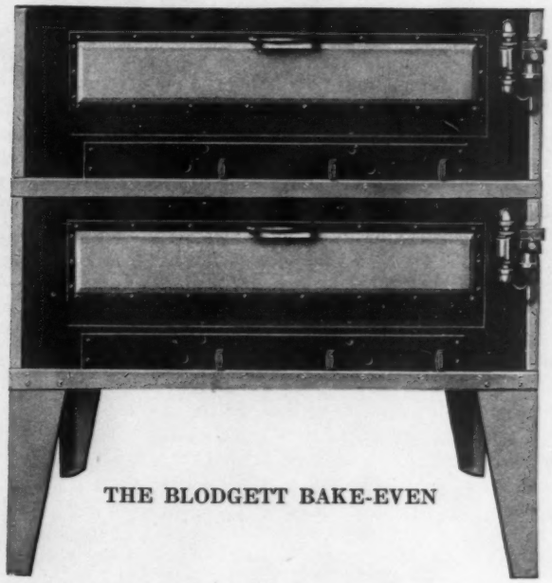
Whereas bond issues for natural gas properties were once very short term issues compared to bonds of other utilities, several issues during this period were for 15- and 20-year terms. This is the result partially of reserves of long life behind some of the issues and partially of the eagerness of the investing public for natural gas securities, the business having had a good earning position during the previous decade when business in general was booming and competition with other fuels was less keen than it has been for the past 5 years.

There has been a general trend in distribution plants towards a more rational form of rate structure, embodying the elements of a service charge and having the promotional features of the step down in rate with increment of quantity. The distressed financial conditions of consumers has in many cases prevented the determination of the real effects of the promotional features of the new forms of rates.

In addition to following the lead of the electric utilities in the matter of rate structure the methods of operation and customer relationship have had a definite trend away from the individualistic and opportunist methods of the plungers of the early years of the natural gas business toward the best practices of utility management and service. Standards of service have quite generally improved and as an aid in service improvement natural gas distributors quite generally have entered the merchandising field, following the example of electric companies.

All this development has been followed by four years of stagnation during which regulation has become more and more drastic and self-serving politicians have urged rate litigation and punitive legislation such as the proposed common carrier bill of Texas. As a result of the depression and the recovery efforts, taxes and payrolls have quite gen-

NOW—Get After the Replacement Business on BLODGETT Ovens



THE BLODGETT BAKE-EVEN

The Importance of this Business Can Hardly Be Over-Emphasized

BLODGETT OVENS
have been famous for their uniformly high quality since 1848

Many established hotels and restaurants are today in need of new bake oven equipment to replace that now in use. The time is ideal to go after this business; and the Blodgett oven, with its super-insulation and heat control commends itself as a desirable unit for hotel and restaurant bake shops, large or small.

THE G. S. BLODGETT CO., INC. BURLINGTON, VERMONT

erally heavily increased, both industrial and domestic sales have considerably decreased, transmission cost has increased with distance and field pressure decline, and net earnings dropped heavily. Yet in spite of this situation operators have been faced, in Oklahoma and Texas particularly, with a frenzy of rate-reducing ordinances. In some of these States the Commissions have joined in the mob spirit and have not hesitated, ignoring both the testimony and the law or distorting them in order to obtain an answer that would suit the political ends, to issue rate reducing orders, well knowing that the orders could never stand the test of a court hearing. It does not cause wonder that the public shows some impatience with regulation when Commission orders and findings with hardly an exception are set aside by the first judicial body to review them. If the public could be made to understand how they are being gypped by the professional agitators and political commissions we could have a reasonable hope that regulation might become an economic matter of some value to the public and of some protection to the utilities.

NATURAL GAS WASTAGE

The Monroe-Richland area in Louisiana has been conservatively produced for the last six years, crater wells from early operations killed or brought under control, and over its life (since 1917) the total waste has been a small fraction of the reserves, though carbon black production at one time consumed about 500,000 M c.f. per day. Oklahoma has had true conservation of gas for many years. The Panhandle, Texas field however, has been a political football with restrictions on use and waste and enforcement of conservation statutes so lenient that decline has become alarming and places in serious jeopardy all pipeline investments dependent upon that area. The daily average use as fuel for the first half of 1934 was about 300 millions, for carbon black production 600 millions and wasted to the air 750 millions. It is estimated that the present waste to the air is nearly 2,000 millions per day. Texas State officials through a State sponsored "Public" corporation propose by the use of some $60,000,000 of Federal money to lay lines from this field to St. Louis and Detroit to provide an outlet for this waste. As an outlet for waste running into the billion figures per day pipelines using less than a hundred billion per year will not be very effective and the continuing waste if not otherwise stopped will likely leave this line with inadequate supplies long before its securities have been retired. It marks the first advent on any large scale of governmental bodies into this business. It is being represented as justifiable as a relief measure and certainly with the lines already built and operating and endeavoring to contract to serve these markets for several years past it can only be so justifiable if at all. Since the operating forces will of necessity live outside the state the only benefits to Texas from the responsibility of the project will be to the Panhandle gas producers and royalty owners and so far as they are concerned more effectual and more efficient relief would be obtained by cash payments to hold the gas in the ground till needed. The employees of the gas manufacturing plants in St. Louis and Detroit and the miners and haulers of the coal for those plants will be relieved only to the extent of being relieved of their jobs. Still it makes a nice big hole into which to dump some Federal money and creates some more opportunities for political appointments.

During this period the world's center of carbon black production moved from the Monroe Field of Louisiana to the Panhandle Field of Texas. A combination of circumstances brought this about, legislative restriction by the State of Louisiana, markets provided by new pipelines in some of which carbon producers were interested, and very cheap residue gas in the Panhandle well adapted for high grade carbon production and giving high yields.

BARBER *Gas* *Pressure* REGULATORS

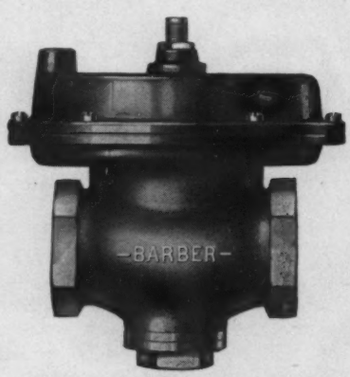
▶ Many of the larger Manufacturers of Gas Appliances, as well as Gas Companies, who use larger quantities of low pressure Gas Pressure Regulators, have switched to BARBER, after making comparative laboratory pressure drop tests and proving for themselves that no other make will show as low pressure drop.

▶ They also prefer our NEW style BARBER Regulators because of their precise machining and assembly; bronze bodies, compactness and general good appearance—as well as their attractive prices.

Why not write today for "stock" sample, complete literature, prices and discounts on the BARBER line?

THE BARBER GAS BURNER CO.

3702 Superior Ave.
Cleveland, Ohio



Made in ¼", ⅜", ½", ¾", 1", 1¼", 1½", and 2" sizes

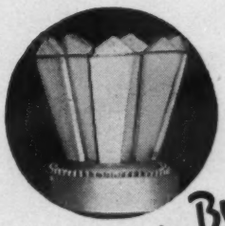
Ray L. Howes Appointed Field Manager for Worthington Division

Ray L. Howes has been made field manager of the newly created eastern oil power division of the Worthington Pump and Machinery Corp., Harrison, N. J., with headquarters at its New York office. Mr. Howe will supervise activities in the Worthington gas engine and diesel lines.

Mr. Howe was educated at Iowa State College. Prior to his college course he spent several years in the shops of the C. & N. W. Railway, subsequently going with the Peoples Gas Light and Coke Co. of Chicago, on power plant and gas engine test and research work. He later was with the Studebaker Corp. of Detroit, leaving there to join the faculty of the Mechanical Engineering Department of the University of Pennsylvania. For the past 22 years, he has been connected with the diesel sales division of the Fairbanks-Morse Co. at St. Louis and Chicago.

Dixon Managing Athens District

R. L. Dixon, former foreman of the Kaufman district of the Community Natural Gas Co., Dallas, Texas, has been made manager of the Athens, Texas, district of the company, replacing L. W. Ewing who resigned due to illness. Mr. Dixon came to the Community Natural Gas Co. at Brownwood, Texas, in 1927. He is a graduate of Texas Christian University at Fort Worth.

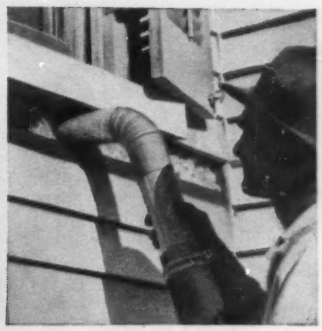


Your Burner for clean, convenient Heat

Our Insulation for Economy and Year-round Comfort

. . . and another Family joins the ranks of Enthusiastic Users of Gas Heat!

Johns-Manville "blows" Rock Wool insulation into a house quickly, simply, economically. No alterations, disturbance, or inconvenience.



Johns-Manville
ROCK WOOL HOME INSULATION

NO MESS in the cellar, no overflowing ash cans at the curb, no day-and-night nursing of a cranky furnace . . . cleanliness and convenience give you a strong sales story.

But how much more compelling your presentation becomes when you couple *your* gas burner with *our* insulation.

Selling this combination, you provide not only cleanliness and convenience, but economy and complete comfort . . . every room in the house kept at a uniformly pleasant and healthful temperature, *winter and summer.*

And you close the sale with the almost positive assurance that the installation will be a complete success; your customer an enthusiastic booster for gas heating.

Why J-M Rock Wool . . .

Rock Wool, as perfected by Johns-Manville, is the most efficient home insulation on the market today. It is permanent, and absolutely non-combustible. We apply it 4 inches thick, consequently it provides maximum insulating effectiveness.

Our experience with *general* insulating problems goes back 75 years. Our contributions to the solution of *home* insulation problems include the development of the blowing machine which first made it possible to insulate existing buildings . . . the "blowing" of more than 30,000 homes throughout the country . . . and more recently the perfecting of handy Rock Wool "bats" for insulating new homes.

Best known name in insulation

Our home-insulation advertising has been extensive and consistent . . . regular schedules in the national magazines, much direct mail, and spring and fall radio broadcasts over national networks.

Talk Johns-Manville Insulation to a prospect and you're talking the insulation that home owners know and respect.

In practically every city, we maintain J-M engineers for consultation on specific problems, and approved J-M insulation contractors, equipped with the blowing machinery and the expert crews to insure quick, economical installations.

May we co-operate with you?

Consult us at any time, on any insulation problem, entirely without obligation. And let us send you our Home Insulation brochure. It tells your home-owner prospects everything they want to know about insulation. Address Johns-Manville, 22 E. 40th Street, New York City.

• Home Insulation can be purchased by your customers on a deferred-payment basis *at Government rates* through the famous Johns-Manville Million-Dollar-to-Lend Plan.

California Railroad Commission Goes on the Air

THE California Railroad Commission has underway a campaign of public information which is unique among public utility regulatory bodies of the country, in its current series of radio broadcasts. Weekly programs are being broadcast every Saturday from Los Angeles, and every Tuesday from San Francisco.

The series of radio messages purposes to inform the California public on services available through the Commission and to familiarize citizens with the nature of Commission proceedings.

Topics on the Los Angeles series of broadcasts give an idea of the scope of matters covered. A number of Commission engineers and officials are on the air covering the following topics: Gas and electric matters, land valuation, gas meters, safety, regulation, water matters, telephone matters, informal complaints, cost of service, transportation matters. A similar group of subjects appears on the San Francisco broadcast schedule.

Station KRKD, owned and operated by the Illustrated Daily News, Los Angeles, which features an extensive educational program, has donated time to the Commission for the Los Angeles broadcasts, which are scheduled for 12:15 to 12:30 p.m. each Saturday. Programs are conducted from the city hall by Joe Micciche, civic radio announcer for the station. The broadcasts began from Los Angeles on February 9 and extend to June 29 as at present outlined.

KGO is the San Francisco station over which the Commission broadcasts are being given, these being under auspices of the State Chamber of Commerce. Ten weekly evening broadcasts from 8:15 to 8:30 p.m., comprise this program, terminating on May 7.

Broadcasts from the Los Angeles station are presented in question-and-answer form, Mr. Micciche querying the various Commission speakers.

Indicating the type of material covered in the individual broadcast, the March 9 dialogue prepared by Carl E. Crenshaw, assistant gas and electric engineer for the Commission, brought out such facts as these:

Commission jurisdiction extends only to privately owned utilities, "municipals" being exempted.

Commission engineers personally check accuracy of utilities' consumer meters, errors found being as apt to favor the consumer as the utility. In question-and-answer form the message proceeded to cover methods of establishing customer credit to secure utility service, conditions governing extension of service facilities, availability of rate information at both Commission and utility company offices, etc.

In the experience of the California Commission the average layman has little or no knowledge as to the methods of regulation or the field covered by Commission activities. It can be appreciated readily that both utilities and commissions can benefit from a well conceived informational effort such as is now being staged in California. Taxpayers are entitled to know something of the state agencies which their money supports.

The California Commission in addition to the five commissioners appointed for six-year terms by the governor, employ 109 people on its staff, made up of auditors, accountants, engineers, examiners, attorneys, court reporters, rate experts, clerical help, etc. On the staff are 44 engineers, eight of them for service on gas and electric matters. Under the Commission's jurisdiction come 1,544 public utilities, including 46 electric and 10 gas companies. Annual revenues of the gas and electric companies under Commission supervision as of December 31, 1933, totaled $188,651,000.

Gas Main Construction

UNITED ENGINEERS & CONSTRUCTORS INC.

New York Philadelphia Chicago

MAXIMUM RETURN TO CLIENTS PER DOLLAR EXPENDED

Attractive Ad-Folio Distributed By Surface Combustion Corp.

SURFACE Combustion Corp. of Toledo, Ohio, has just issued a very complete 1935 "Ad-Folio" on campaign advertising and merchandising material for Janitrol and Heatmaster gas home heating equipment. Three individual looseleaf folios giving thorough attention to newspaper, direct-by-mail, and window display campaign promotion make up the Ad-Folio.

"Newspaper Helps for the Ad Man" in addition to giving an analysis of successful newspaper campaigns, function and value of newspaper advertising comprises a "mat book" containing some 20 reproductions of newspaper advertisements and approximately 100 miscellaneous illustrations which are available in mat form. All material included in the "mat book" is copyrighted by Surface Combustion Corp. and is restricted to the use of those engaged in merchandising Surface Combustion equipment.

The second folio deals in detail with different phases of the purpose, application and effectiveness of direct mail, and includes colorful samples of the mailing pieces under discussion, small folders, envelope stuffers, and larger pieces of attractive literature.

The third folio, containing window display material, provides a variety of units, fully illustrated, some in color, which may be utilized as a part of complete window displays.

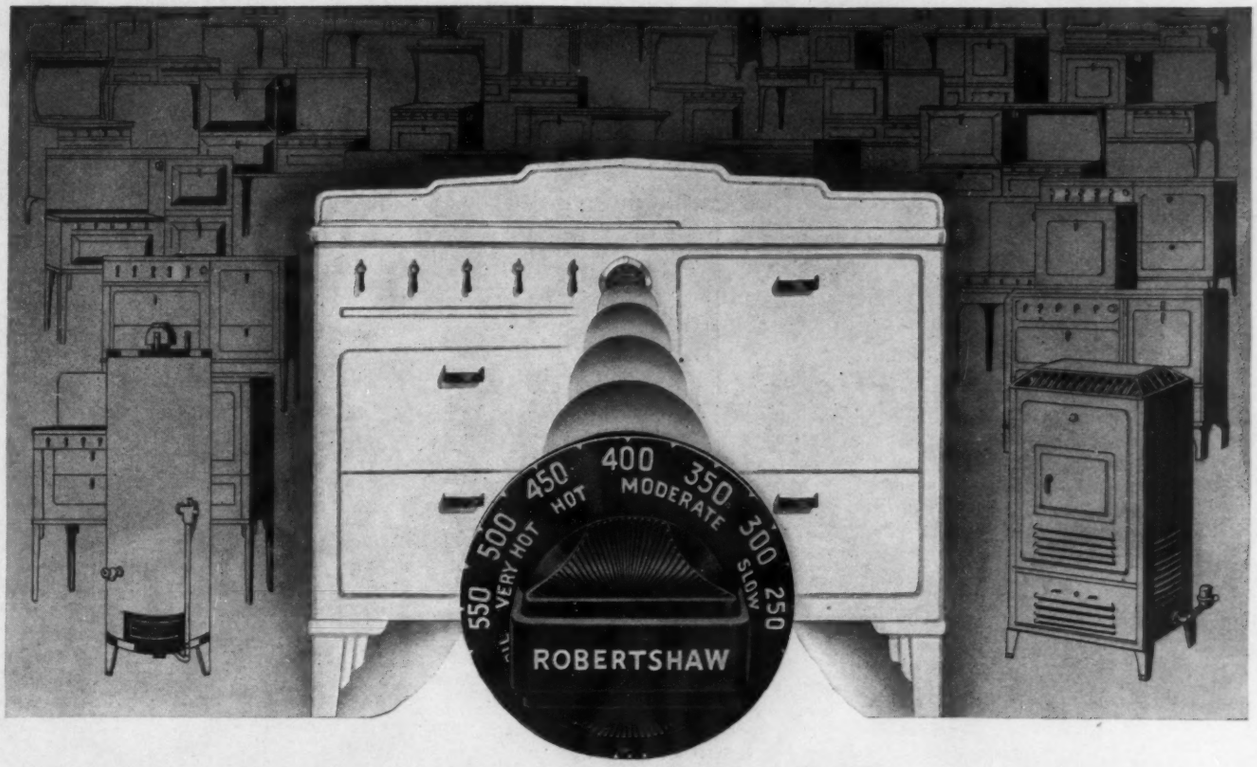
Company Permitted to Discontinue Service to Salyersville, Ky.

The Kentucky Public Service Commission has extended permission to the Federal Public Service Corp. of Kentucky to discontinue natural gas service to Salyersville, Ky., effective May 1, because of insufficient supply. The company must give its 266 consumers in Salyersville 30 days' notice prior to actual discontinuance.

Peoples Gas Light Appointments

Winfield Foster, formerly publicity associate of The Peoples Gas Light & Coke Co., has been appointed superintendent of publicity.

Ernest S. Beaumont, former director of the safety division of the company, has been made assistant manager of the industrial relations department.



The Prosperity of the Gas Industry is Vital to the Welfare of Thousands

MAKERS of gas thermostats since 1899, the Robertshaw Thermostat Company, of Youngwood, Pennsylvania, has built up a specialized business that *directly* supports more than a third of all the people living in the community of Youngwood. Indirectly it aids the production and sale of gas ranges, water heaters, space heaters and other automatic gas appliances all over the country.

How the gas utilities and gas appliance manufacturers have worked together to bring better living to millions of Americans is graphically illustrated in the history of the gas range oven heat control.

Fifteen years ago, cooking was still being done as it had been since the dawn of history. It was a tedious, laborious task, requiring constant attention to keep the heat at more or less the proper temperature. This was true regardless of the fuel used. Then the oven heat control was developed. This remarkable device automatically kept the oven heat at the desired temperature for an indefinite period of time without the slightest attention from the person doing the cooking.

Such a revolutionary change in cookery methods might well be expected to have been received with acclaim. Such was not the case. If it had not been for the gas utilities and their unceasing aim to make gas the perfect fuel, the use of the oven heat control on gas ranges might still have been in its infancy. The same thing can be said of the use of all automatic devices on gas appliances.

Any gas range, or other gas appliance, that is Robertshaw equipped merits extra attention in your advertising, selling and demonstrating plans. For the Robertshaw is so well known, thanks to many years of aggressive advertising, that you can always gain a woman's interest by pointing out the Robertshaw. Your selling work is always more than half done when she understands how much Robertshaw automatic control will help her in her daily housework. Try it now—while you have the benefit of the Robertshaw spring campaign in The Saturday Evening Post.

ROBERTSHAW THERMOSTAT COMPANY • Youngwood, Pa.

ROBERTSHAW

THERMOSTATS

FOR ALL TYPES OF GAS APPLIANCES

Minnesota Northern Organizes to Combat Crime Wave

THE sales department of Minnesota Northern Power Co., Minneapolis, Minn., has the bloodhounds out this spring and every employee is deputized in a giant "man hunt" which is due to place a number of public enemies under lock and key. A. E. Schwarz, just before leaving his post as commercial manager for Minnesota Northern to join Electric Bond & Share's gas sales promotion staff, laid out the three-month selling effort, and around the grim theme of a "man hunt" has set up a campaign routine which should bring another notable increase in Minnesota Northern's sales curve.

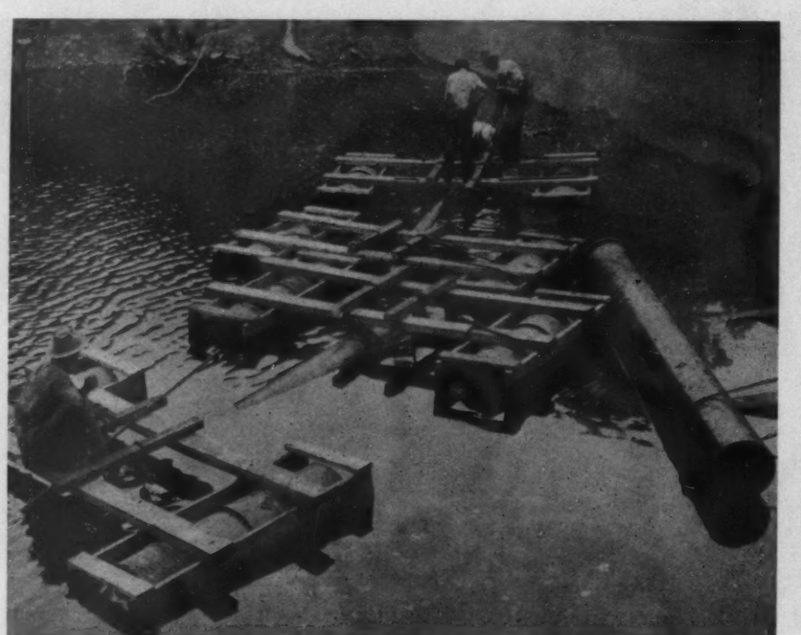
The man hunt began on April 1 and will close June 28. Division managers of the company are styled as police commissioners and will assign campaign activities in their sections, dividing cash prizes among those who account for the capture of the most criminals, which in this case are unsold appliances. In addition to general division cash prizes, there are three cash awards for high sales of ranges, water heaters, and refrigerators, and three special prizes for employees who turn in the greatest per cent of worthwhile prospects.

Division managers are given considerable latitude in supplying local adaptations of the "man hunt" theme for the campaign.

Sales inducements feature minimum down payments and small monthly terms. On storage water heaters, for example, $1 down payments and 90 cents per month are typical terms offered.

Cover of spring sales portfolio for "man hunt" campaign of Minnesota Northern.

The campaign was introduced to the Minnesota Northern sales organization at the company's annual sales meeting held in Miles City, Mont., on March 28, 29 and 30. A stirring courtroom scene was staged by Mr. Schwarz, who as bailiff called attention to a crime committed in Minnesota Northern territory—equal in degree to murder, in that it shortens the useful period of human life—the crime of using inefficient and old-fashioned home appliances. Prisoners were summoned, charged with such crimes as making housewives work under sweatshop conditions in the home, occasioning food spoilage and disease by improper refrigeration, etc., etc. Salesmen were deputized and the 90-day man hunt was officially launched.



Laying Mono-Cast Doublex Simplex Centrifugal Pipe under water at a point of almost inaccessible working conditions. The deflectable Doublex Simplex Joint permits making up bottle-tight gas joints above water or on skids above a trench, then lowering in. This feature frequently solves otherwise difficult and expensive construction problems. For literature on this pipe write American Cast Iron Pipe Co., Birmingham, Ala.

J. D. Creveling Serving With F. L. Chase on B. of M. Board

IN addition to the appointment of Frank L. Chase, vice-president and operating manager of the Lone Star Gas Co., Dallas, Texas, to membership on the Advisory Board of the United States Bureau of Mines, to represent the gas industry, as reported in *Western Gas* for April, 1935, J. D. Creveling of Henry L. Doherty & Co., New York, has also been appointed to serve on the Board.

Twenty-nine leaders of the mining and allied industries have accepted invitations from Secretary of the Interior Harold L. Ickes, to act on this Advisory Board, the purpose of which is to advise the director of the Bureau, Dr. John W. Finch, on various matters of Bureau policy.

H. C. Fremming and John L. Coulter, president and secretary-treasurer, respectively, of the International Association of Oil Field, Gas Well, and Refinery Workers of America, Washington, D. C., have been asked to represent oil and gas field workers on the board.

Members of the Advisory Board are designated to serve for a period of one year.

Major Industrials Taken On by Pacific Gas and Electric

Recent large industrial gas installations in the territory of the Pacific Gas and Electric Co. include the plant of the Amalgamated Sugar Refining Co. at Clarksburg, and the West Oakland Yards of the Southern Pacific Co.

The Amalgamated Sugar Refining Co. is constructing a new plant at Clarksburg, 10 miles from Sacramento, which will be in operation from July 15 to November 1, and will utilize approximately 3,000,000 cu. ft. of gas per day. A 5-mile gas extension line was built to serve the new plant, involving a crossing across the Sacramento River. All five of the beet sugar plants in the P. G. and E. territory as well as the cane sugar plant in San Francisco, are now served with natural gas.

The West Oakland yards of the Southern Pacific Co. are being piped for gas supply to the boiler plant and roundhouse. Converted from oil fuel, this installation will be on the lines about May 1, using approximately 100,000 cu. ft. of gas per hour.

Utah Utilities Occupying New Offices May 1st

Utah Gas and Coke Co., Wasatch Gas Co., and the Ogden Gas and Coke Co., Salt Lake City, Utah, are moving general and commercial offices into their new 2-story building at 36 South State Street, about the first of May, according to J. D. Roberts, vice-president and general manager of the companies. The companies formerly maintained headquarters at 45 South Main Street.

Eleven—count 'em and consider 'em—eleven Exclusive Features in the line of Estate *Modern* Gas Ranges for 1935. Add them all together and you will know part of the reason why shipments of Estate Gas Ranges for the first quarter of 1935 showed a gain of 153 per cent over the corresponding period last year.

The photograph shows the No. 425 Estate. Note the broiler drawer directly under, the Utilitoaster compartment directly behind, the table-top section. There are six other table-top models in the line, including a new version of Estate's famous "Perfect 36" (only 36 inches wide) with built-in kitchen heater.

★

The lithographed cut-outs are in four beautiful, springtime colors. They are sure "stoppers", but beyond that they do a fine selling job. ★ For catalogue of Estate Ranges and Estate sales helps, write to The Estate Stove Company, Hamilton, Ohio. Warehouse stocks are carried in Los Angeles, San Francisco, Portland, Minneapolis, Dallas.

George W. Crawford, Natural Gas Pioneer, Dies April 6

GEORGE W. Crawford, Pittsburgh, Pa., pioneer figure in the natural gas industry, died April 6 at the age of 73, after an illness of several months. He was chairman of the board of Columbia Gas and Electric Corp. and also chairman of the Lone Star Gas Co. board.

Born at Emlenton, Pa., in 1861, Mr. Crawford started work in the oil and gas fields of that section at the age of 19. After earlier activities in the oil pipe line business he formed a partnership with M. C. Treat under the firm name of Treat & Crawford, operating first in the Corning, Ohio, fields, developing the Corning Natural Gas Co. in 1893 to pipe natural gas to Corning and adjacent towns.

Within the next few years headquarters were moved successively to New Martinsville, W. Va., Sistersville, W. Va., and in 1901 to Pittsburgh. During this time Mr. Crawford was instrumental in organizing the New Martinsville Gas Co. (W. Va.), United Gas Co. and Mt. Vernon Natural Gas Co., (Ohio) and Fayette County Gas Co., Pa.

In 1902 a holding company known as the Ohio Fuel Supply was formed, which purchased numerous Ohio natural gas properties. Mr. Crawford was president of this company until its merger with Columbia Gas and Electric. He also served as president of the Tri-State Gas Co. prior to its merger with Manufacturers Light & Heat Co., of which he was a director.

During the early development of the mid-continent gas and oil fields he was active in the formation of the Devonian Oil Co., the Hecla Oil Co., Keaney River Gas Co., Oklahoma Fuel Supply Co., and the Oklahoma Natural Gas Co.

In 1909 Treat & Crawford joined with Hope Natural Gas Co. to form the United Fuel Gas Co., which purchased various natural gas plants in Kentucky, West Virginia and Ohio. In the same year Mr. Crawford took a leading part in formation of the Lone Star Gas Co. in Texas. He was chairman of the Lone Star Gas Corp. board at his death.

In 1924, he helped in the formation of the Ohio Fuel Corp., being elected president. In 1926 he assisted in the organization of Columbia Gas and Electric Corp., and at the time of his death was chairman of the Board.

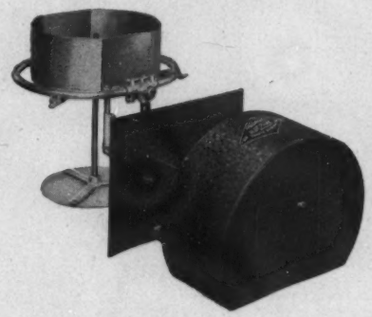
He joined with Ohio Oil Co. in recent years in the formation of Western Public Service Corp., and was elected chairman of the board of directors. This company was responsible for development of gas in Wyoming, Utah and Colorado and service to Salt Lake City, Ogden and other communities.

New Members Elected to Seattle Gas Co. Board of Directors

The Seattle Gas Co. announces the election of Gene B. Heywood, of Los Angeles, Calif., partner of Young, Clarke & Co., stock exchange firm, and Alexander Macomber, of Boston, Mass., president of the Association of Massachusetts Gas Companies, to the board of directors of the company.

Hotzone Gas Furnace Burner Announced By Welsbach Co.

The Welsbach Co., Gloucester, N. J., announces a new product, the Hotzone gas furnace burner, designed to fit all sizes of domestic furnaces and boilers for house heating. The burner utilizes a silently operating luminous flame burner head, incorporated for several years as a feature of the company's water heater models. The self-radiant qualities of the luminous flame burner make the use of refractory material unnecessary. No air shutters or air ports are incorporated. The luminous flame requires no admixture of air and gas and eliminates the possibility of flashbacks.



Installation can be made through ash pit door, clinker door, fire door, or through a hole drilled in side of furnace.

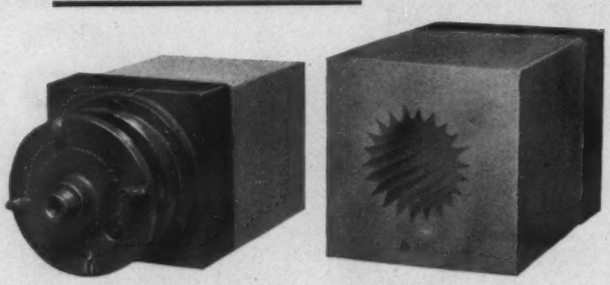
Kansas Pipe Line Removal Order Reversed

The Supreme Court of the United States on April 1 reversed, on appeal from the State Supreme Court of Kansas, an order of the State Highway Commission of Kansas directing the Panhandle Eastern Pipe Line Co. to relocate its transmission lines at its own expense. The order of the highway commission directed the pipe line company to remove its transmission lines on the adoption of plans for a new highway crossing the company's right-of-way, without reimbursement to the company of the cost of the changes. The Kansas statute authorizing the commission to require the company to remove the pipe line at its own expense was declared unconstitutional as to the pipe line company in that its property would be taken for public use without compensation and, therefore, without due process of law, contrary to the Fourteenth Amendment to the Federal Constitution.

61 Per Cent of Commercial Heating Load Sold to Gas

Since the introduction of natural gas into the territory of the Pacific Gas and Electric Co., five years ago, 61 per cent of the potential commercial heating load has been secured. This applies to apartment houses, schools, hospitals, institutions and office buildings, and represents a large amount of new equipment in addition to the installation of conversion burners. A further revealing fact is that, during this time, less than 3 per cent of the converted installations have gone back to their previous fuel.

DFC Refractory Gas Burner



Ideal for use in kilns, or other industrial furnaces where burner is built directly into the brickwork and must resist soaking heat.

. . . proportioned to standard fire-brick sizes; installation extremely simple.

. . . high-alumina refractory nozzle will resist heat beyond top limits of first quality fireclay brick;

. . . extremely flexible firing range permits use in drying as well as firing operations.

Write for Bulletin 305-A

THE DENVER FIRE CLAY COMPANY

DENVER DFC COLO. U.S.A.

BRANCHES AT SALT LAKE CITY, EL PASO, AND NEW YORK

BETTER HOUSING PROGRAM

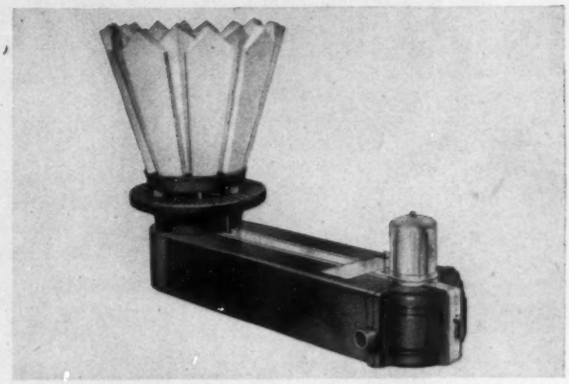
MANY ADVANCED AND *Exclusive* FEATURES!

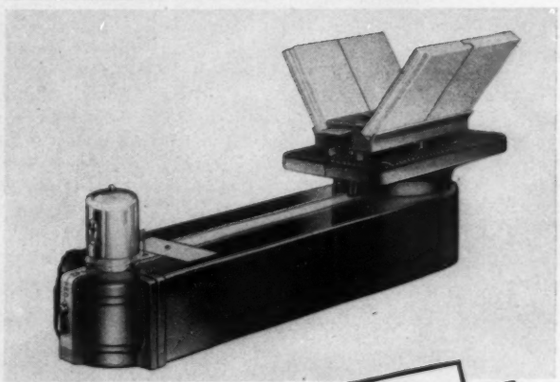
AN ASSEMBLY OF FEATURES OF *REAL MERIT!* AVAILABLE ONLY IN THE NEW JANITROL

The *exclusive features* listed below make it easier to sell JANITROL. Take advantage of them when you go after your share of the modernization business now available under the Federal Housing Act.

1. Complete, tamperproof enclosure of *all* controls—plus compact, attractive appearance.
2. Positive acting, *foolproof* electrical pilot ignition assures safe customer operation.
3. An Automatic Pilot that is *safe*—operates in seconds (not minutes), a necessity when using the new sensitive room thermostats.
4. Automatic Pilot actuated by pilot flame *only*—not affected by surrounding temperatures in ash pit. Timing always constant.
5. Pilot *supply line* and *orifice* is easily removable for cleaning outside of furnace—*without* removing pilot assembly or disturbing timing adjustment.
6. The most complete line. There are 10 different types and 36 sizes of standard JANITROLS, permitting the selection of the correct unit for any type of boiler or furnace.
7. Patented baffles lean against firepot walls and overlap each other, insuring maximum radiating effect and positive scrubbing action of gases against firepot walls. The overlapping feature also permits maximum baffle flexibility, and *correct* application in firepots.
8. One common, integral control unit between gas inlet and gas orifices. Easily removed or installed as a complete assembly.
9. Complete factory assembled, wired and tested—easily installed with minimum labor.
10. Removal of end enclosure permits making all air and gas adjustments. Adjustments can be made quickly and without *uncontrolled air effecting combustion* while adjustments are being made.

In addition to these *exclusive* features JANITROL has all the advantages offered by any conversion burner. 75,000 JANITROL installations are already in operation.





TIE IN YOUR SALES ACTIVITIES WITH THE FEDERAL HOUSING ACT

SC **Surface Combustion**

TOLEDO, OHIO SALES AND ENGINEERING SERVICE IN PRINCIPAL CITIES

Photo taken at American Gas Products Corp. exhibit in Chicago. A.G.P. representatives in the group include H. H. Dugdale, general sales manager, New York; William V. Garrison, chief engineer, also of the New York office; A. I. Wallace, Sr., A. I. Wallace, Jr., and John Murphy, of the Chicago office.

American Gas Products Models Given Chicago Showing

GAS men of Metropolitan Chicago were given the opportunity in April to view the new model of the Empire Ideal Gas Fired Boiler of the American Gas Products Corp. in a special 10-day showing given the appliances in the Peoples Gas Building under the joint sponsorship of the New York and Chicago offices of American Gas Products.

H. H. Dugdale, general sales manager of the company, with headquarters at the New York office, attended the opening day of the exhibit, then continued on a business trip into the Southwest later to resume with a showing of the appliances at the Memphis Natural Gas Department meeting. William V. Garrison, Jr., chief engineer of the company, also attended from the New York office.

Prior to the showing invitations had gone out to the gas men in the Chicago area over the signature of A. I. Wallace of the Chicago office, giving the dates for the showing. Large numbers of gas men attended.

Sharing the interest of the new line of boilers was the new water heater of the company, similar in style and design to the boiler.

Among the features of the boiler described to the visitors was the A.G.P. Thermotor, which automatically provides even temperature in the house. All openings for pipe connections have been placed in the back in the new boiler, which is made in 18 sizes for small or large homes.

Casper-Lakota Contract Void; Election on Plant Purchase Required

Contracts entered into between the city of Casper, Wyo., and the Lakota Oil & Gas Co. for the company to furnish the city with gas and for the city to take over the physical assets of the former New York Oil Co. within Casper corporate limits, has been rendered null and void by a decision handed down by the Fourth Judicial District Court of Wyoming.

It was ruled by the court that the purchase of gas plants by cities in Wyoming must be authorized by special elections and not by the action of a city council. Demurrers of the defendants in the case, the New York Oil Co. and the City of Casper, were sustained, ruling that the petition of the plaintiff failed to disclose that the proposed purchase by the City of Casper of the gas plant of the New York Oil Co. had been authorized at a special election as required by Chapter 78 of the 1933 Session Laws.

PEERLESS
RADIANT GAS HEATERS

Attractive
Efficient
Economical
Sturdy
Guaranteed

A. G. A. Approved

WRITE FOR DETAILS
PEERLESS MANUFACTURING CORP.
1400 W. ORMSBY
LOUISVILLE, KENTUCKY

Sales to Employees by Employees Campaign

THE Northern States Power Co., Minneapolis, Minn., serving communities in Minnesota and Wisconsin, is featuring a "$5,000 Employee Prize Contest" campaign in its latest sales drive, which is the most intensive load-building program in the company's history.

A quota of 1,000 major appliances sold to employees of the company by employees is the object of the contest. Provisions are also made for additional cash prizes should any division exceed its specific quota.

All employees are divided into two groups named the "haves" and the "have nots," comprising those employees who already have gas or electric ranges, water heaters, or refrigerators, and those who have not.

When an employee of the "have" group sells an employee in the "have not" group he is awarded a share of stock worth $4 if the quota of his division is reached. As soon as the sale is completed the former "have not" employee is transferred to the "have" group. He is given a small button in the form of a Northern States Power Co. shield, on which three different colored stars, representing range, water heater, and refrigerator may be fastened. Thenceforth he becomes eligible to participate in the campaign to sell a "have not."

Credit is issued only on sales representing new business and not on replacement sales. Territorial rights to solicitors were granted the first two weeks of the drive. A "rovers" solicitation plan is now being followed whereby all employees, regardless of whether they are in the "have" or "have not" group, are permitted to solicit in their own division.

Safety Pilots and Relief Devices Required on Water Heaters

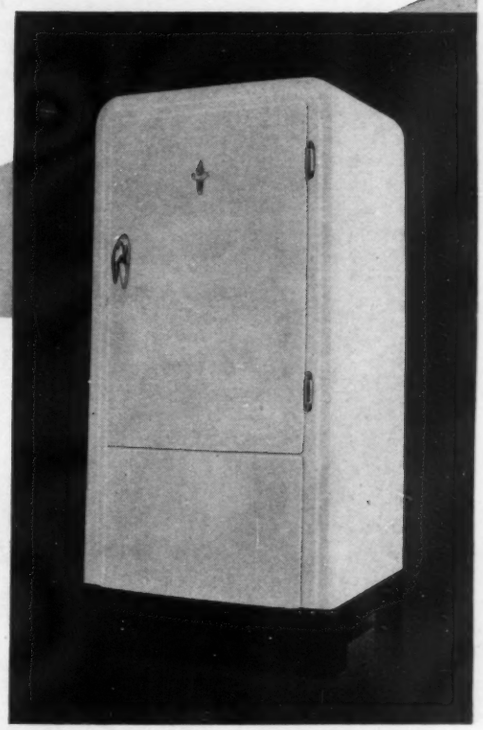
All A.G.A. approved automatic gas water heaters regardless of the date Testing Laboratory approval was granted, must now be supplied with automatic devices to prevent escape of unburned gas (safety pilots), and all A.G.A. approved storage type gas water heaters will soon be required to have means for relieving excessive stored water temperatures and pressures as regular equipment.

The requirement necessitating use of means to limit both temperatures and pressures on all A.G.A. storage gas water heaters will become effective on July 1, 1935. Storage type water heaters, for purposes of this requirement, are considered as being only those approved by the Laboratory with a storage tank as an integral part of the appliance. Standard thermostats are not interpreted as being relief devices although satisfactory automatic gas shut-off valves actuated by storage water temperature will meet that part of the requirement providing for temperature relief equipment. Means of relieving excessive pressures must, however, also be provided.

WITH AN ENVIABLE RECORD IN THE PAST—

Philadelphia

ALREADY 142% AHEAD IN GAS REFRIGERATION SALES



USES NO WATER

PHILADELPHIA gas men are at it again—*breaking records!* Each year for the past three years, they've beaten their own previous record by a generous margin. Now they're out to do it in 1935!

During the first quarter of this year, gas refrigeration sales by Philadelphia Gas Works salesmen *more than doubled* those for the same period in 1934. And "open season" on refrigerator prospects has just begun!

Aggressive Selling

What is the secret of Philadelphia's sales success? One important reason is aggressive, intelligently directed selling. The sales force consists of specialty salesmen who sell refrigerators only. And this year, as an additional incentive to good salesmanship, Philadelphia Gas Works have instituted the Quintuplet Club. Membership in this club is a high honor, and goes only to those salesmen with outstanding sales accomplishment. Already, 43 Philadelphia gas men have brought in multiple sales in a single day; some making as many as 5 individual retail sales as result of one day's work.

Product Superiority

It is such aggressive selling as this—*plus* the vital competitive advantages of gas refrigeration—that account for Philadelphia's remarkable sales achievement. The new 1935 Air-Cooled Electrolux is easier than ever to sell. It is years ahead in beauty, as it has always been ahead in performance. The 1935 Electrolux offers every gas company a product which it can be proud to offer to its customers. By putting definite sales effort behind Electrolux you can make sure that the refrigerators installed in your territory are *gas* refrigerators! For *1935 is gas refrigeration's year.* Plan now for aggressiv gas refrigeration selling during the coming months! Servel, Inc., Electrolux Refrigerator Sales Division, Evansville, Indiana.

NEW *Air-Cooled*
ELECTROLUX
THE SERVEL *Gas* REFRIGERATOR

REMEMBER: 1935 IS GAS REFRIGERATION'S YEAR!

Reserve Accrual Problems in Natural Gas Rate Cases

(Continued from Page 40)

a high average rate of replacement is experienced. This fact which is frequently overlooked has a profound bearing on all matters pertaining to the relation between the average life, the ratable decline in per cent condition, and the annual rate of replacement of steel pipe. It may be explained by the simple statement that in a group of property units subjected to varying external conditions that contribute to failure, the rate of failure will always be greater than indicated by the average life of the group.

CREDIT BALANCES IN RESERVE ACCOUNTS

It has been definitely established that credit balances in a reserve account at the date of inquiry, whether represented by reinvestments in property or by money on hand, cannot be used to modify the current and future requirements for reserve accruals. (Board of Public Utility Commissioners v. New York Telephone Co., 271, U. S. 15.) In view of this fact, the determination of the reserves required at any inquiry regarding rates for service should be based upon an analysis of the future requirements of property in service at the date of inquiry without reference to the existence, or the nonexistence, of any accumulations from past earnings earmarked as depreciation reserve.

Despite the clear and unmistakable language of the United States Supreme Court in the case cited, the existence of a credit balance in a so-called depreciation reserve account becomes a focal point of controversy in every rate case. This is particularly true if existing credit balances exceed the amount of the depreciation found in the property under consideration. There seems to be a feeling on the part of regulatory authority there is something sinister in the existence of credit balances despite the fact that a credit balance is an essential element in the theory of reserve accountancy.

If in a given property the annual cost of replacements, removals and abandonments was uniform throughout its operating history, if no loss in value could be sustained by reason of a decline in per cent of new condition, and no losses could be incurred by reason of final liquidation, then the necessity for the accrual of reserves would be removed and the accumulation of a credit balance would be superfluous. Unfortunately, these conditions are not encountered in practice and common experience has suggested the use of uniform accruals in order to provide a reservoir of funds with which to level out increasing and fluctuating costs of operation as well as to provide for the liquidation of inevitable capital losses.

Since this is true, the existence of the reservoir of funds becomes the basis of the process.

Why should the credit balance at any given time substantially exceed the amount of the depreciation found by observation? The line of reasoning which demonstrated the fact that an annual reserve accrual should substantially exceed the ratable decline in per cent condition applies with equal force to the answer to this familiar question. Just as the reserve accrual itself is designed to provide for various costs and losses, so the balance created by this accrual is designed to meet these costs and losses. Those portions of the credit balance which must provide for the excess cost of piece-meal replacements, the cost of removals and abandonments caused by changed operating conditions or public requirements and the losses involved in final liquidation, find no counterpart in a determination of the per cent of new condition of an operating property.

The decision of the United States Supreme Court in the Board of Public Utilities Commissioners v. N. Y. Telephone Co., 271 U. S. 15 left no doubt as to the status of an existing credit balance with reference to its status as free capital when invested in facilities for service as distinguished from a fraud, the earnings from which should be added to the reserve accrual itself. Despite the definite inhibition placed upon the use of a credit balance to supplement future accruals which would otherwise be inadequate, it is evident that consideration should be given to the fact that reserves accrued for certain purposes and the corresponding balances resulting from these specific accruals find no counterpart in the deductions from value made by reason of observed depreciation. It is certain that an equitable solution of the problem suggests that the portion of the total annual accrual represented by the provisions for the cost of replacements, removals and abandonments caused by changed operating conditions and public requirements as well as that portion of the accrual represented by the provision for final liquidation should be reduced by the application of reasonable interest earnings upon the proportionate part of the credit balance for which they are responsible.

This statement, however, must not be construed to mean that all of the property represented by a reinvestment of the reserve account should not be included in the rate base upon which a reasonable return should be earned. It simply means that the total annual reserve rate should be modified to the extent that the credit of interest on these parts of the total balances should be used to reduce this annual rate.

CURRENT CHARGES TO RESERVE ACCOUNTS

A universal practice on the part of regulatory authority is the attempt which is made to measure proper annual reserve rates by means of current or past charges made against reserve accounts. This procedure is unsound for several reasons. In the first place, natural gas properties are, as a rule, comparatively young properties and the current rate of replacement of property units could be no proper criterion of what the average rate of replacement will ultimately become. In the second place, practically

A FAST-WORKING MELTING FURNACE

The Johnson No. 15 Melting Furnace has a capacity of 18 lbs. of lead. Will melt its capacity in less than 10 minutes! Equipped with powerful Johnson Bunsen Burner with shut-off valve and pilot light. Write for free catalog giving full details.

JOHNSON GAS APPLIANCE CO. Cedar Rapids IOWA

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WESTERN GAS
810 So. Spring St., Los Angeles, Calif.

Gentlemen: Starting with the next monthly issue, you may send WESTERN GAS to the undersigned. Upon receipt of your invoice, remittance will be sent to cover (1 year $2.00) or (2 years $3.00). Other than U. S. $3.00 per year.

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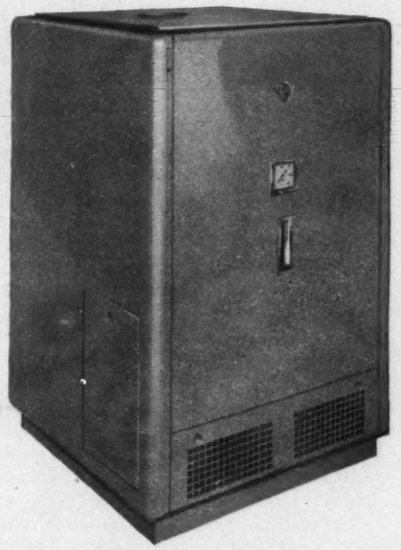
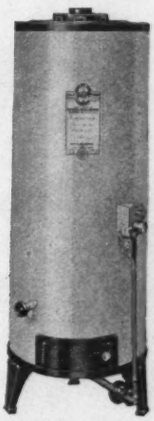
THE COMPLETE LINE OF

AGP PRODUCTS

IS THE LINE OF PROFIT



The New
"EMPIRE"
IDEAL
Gas Boiler



AGP REGULAR

Gas-Fired Automatic Storage Water Heater. Galvanized or Everdur; 20 to 75 gallon sizes.

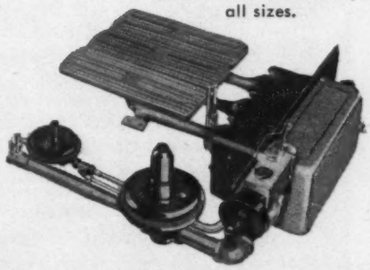
THE DICTATOR

Low-Priced Water Heater. Galvanized or Everdur; 15 to 40 gallon sizes.

TAKE THE LINE OF LEAST RESISTANCE for

REDFLASH GAS CONVERTOR

Tailor made for Series No. 1 "Ideal" Redflash Boiler, all sizes.

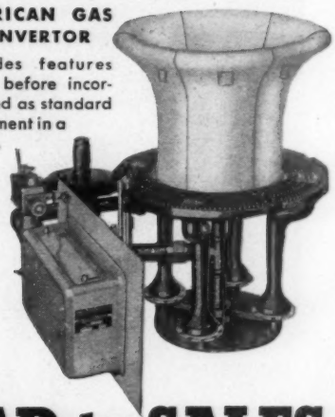


IDEAL GAS CONVERTOR

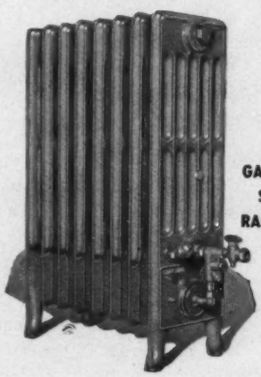
Especially adapted for Arco Round Boiler, but fits any round type boiler or furnace.

AMERICAN GAS CONVERTOR

Includes features never before incorporated as standard equipment in a boiler.



THE QUICKEST, SHORTEST ROAD to SALES



AGP GAS-FIRED STEAM RADIATORS

UNIT-OR GAS-FIRED HEATER

Whenever you think of heating with gas, think of

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AMERICAN GAS PRODUCTS CORPORATION
DIVISION OF AMERICAN RADIATOR COMPANY
40 WEST 40TH STREET · NEW YORK, N.Y.

every natural gas property has been built up by substantial net additions, and the actual replacements which are currently made reflect the realized depreciation on a relatively small part of the total property, while the reserve rate, if properly determined, should apply to all the property in service.

An analogy that clearly illustrates the fallacy of the method under discussion is that of an automobile with a new set of tires which have a service life of approximately 25,000 miles of travel. It is evident that no charges for replacement of tires would be made during the first three or four thousand miles of service, but this fact in no way affects the ultimate liability for the replacement of tires, nor does it remove the necessity for the setting aside of a reserve with which to make the ultimate replacement. Finally, the premise is in error for the reason that substantial portions of the reserve rate, and the balance therefrom, can have no current charges made against them. This applies to that portion of the total accrual set aside to amortize the property as a whole at the end of its service life, and it also applies to that portion of the credit balance which should be accumulated to offset the current and future decline in per cent of new condition which represents an ever present factor of depreciation which has occurred in the property but which has not been fully realized, or at least, realized to the extent that replacements are necessary.

These statements must not be construed to mean that current charges to a depreciation reserve account are not indicia of what the annual reserve rates should be, but an assumption that they should provide the full measure of what these rates should be is utterly unsound.

CURRENT CREDITS TO RESERVE ACCOUNTS

Current credits to reserve accounts which reflect the current accounting practice of an operating company are too largely controlled by current earnings to reflect even what might be construed as the best judgment of the management with reference to what constitute proper reserve rates. It is also true that current credits to reserve accounts in the natural gas industry are frequently set up without the possession of the necessary data which should be used in connection with the fixing of such rates.

The foregoing discussion covers in a brief and general way the controversial questions which arise in connection with the determination of reserve rates. A discussion of this nature can do no more than suggest the method of approach to a correct answer to these questions. In the final analysis, the determination must be made upon the basis of the experience of individual properties, and a study of the conditions under which they operate. Every natural gas company should accumulate data relative to the mortality characteristics of its various property classifications. These data should cover the installation dates, the replacement rates, causes for replacements, and the condition of the property removed.

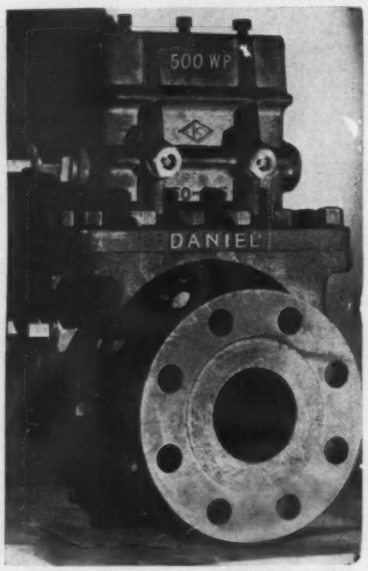
All pipe removed for causes other than its physical condition should be carefully examined, and the extent of corrosion noted and correlated with the soil conditions under which the corrosion took place. Due to the wide variation in the external factors that affect the service life of such units of property as steel pipe, it is impracticable to develop any general rules which can be made to apply to specific properties. In view of the extreme importance of sustaining adequate reserve rates in connection with any legislative or judicial review of existing rate schedules of the natural gas properties, the management of these properties should make every effort to accumulate reliable mortality data with which to support their contentions. The interpretation of these data and the application of this interpretation to the solution of this all important problem can only be done by individuals who are particularly qualified to perform this task.

Republic Steel Corp. Names S. F. Firm Warehouse Distributor

The Gilmore Steel & Supply Co., 295 Folsom St., San Francisco, Calif., has been named warehouse distributor of Enduro stainless steel, according to an announcement by N. J. Clarke, vice-president in charge of sales for Republic Steel Corp., Youngstown, Ohio.

With the appointment of the Gilmore Steel & Supply Co., there are now 45 warehouse stocks of Enduro stainless steel in principal cities from coast to coast.

Modernize *with* DANIEL ORIFICE FITTINGS



DANIEL "SENIOR" TYPE

By a series of gears and one wrench, orifice plate in line can be changed under pressure in less than three minutes.

Eliminates expense of a by-pass. Occupies less space in the line. Works equally well on air, steam, dry gas, wet gas, or corrosive gas.

Designed with high factor of safety for pressure and line strain.

Reasonable in cost, mechanically correct, easy to operate, simple in design, rugged in construction—dependable — fool proof. A High Grade Fitting for a definite purpose.

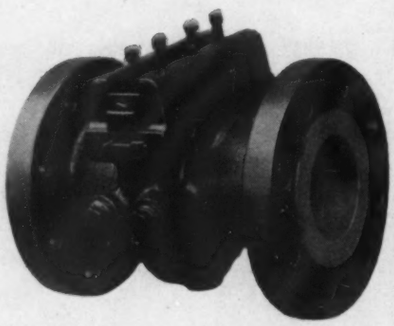
Made in all sizes and pressures. Prices on application.

DANIEL "JUNIOR" TYPE

Same as Senior Fitting, except does not have upper equalization chamber and cannot be changed under pressure. Is less expensive.

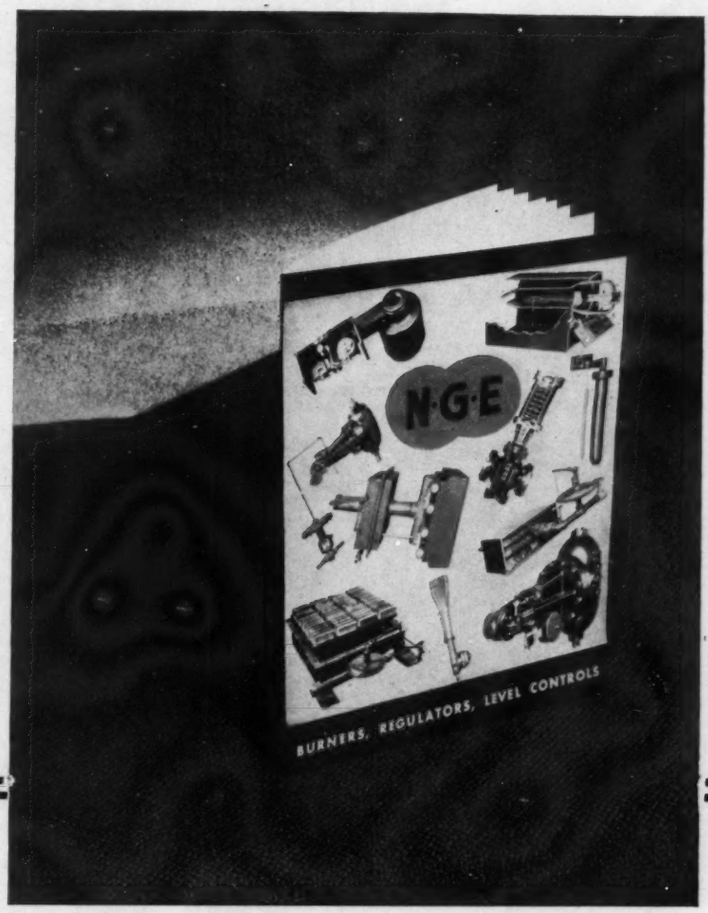
Made in all sizes and pressures.

Prices on application.



DANIEL ORIFICE FITTING CO.

2719 ELM ST., LOS ANGELES



THIS *new* BULLETIN

covers 12 years of progressive manufacture!

This month marks the 12th anniversary of N.G.E. service to the natural gas industry of California. During that period of time this organization has developed and perfected many of the industry's most progressive types of gas burners, regulators and liquid level control equipment. By constant research N.G.E. has not only kept pace with outstanding equipment improvements, but has in the majority of instances led in this development.

Because of the organization's location, the great gas fields of the West serve as a natural testing laboratory in which exhaustive experimental work may be carried on. N.G.E. lines are designed by trained engineers and fabricated by skilled mechanics. These factors, plus the service rendered by a properly trained field force, are behind the reputation N.G.E. has built in the natural gas and petroleum industry field since 1923.

Write today for your copy of this new N.G.E. bulletin. In it you will find complete information on N.G.E. gas burners, N.G.E. liquid level controllers, Wilgus - N.G.E. gas fuel and pressure regulators, as well as material and equipment manufactured for use in propane dewaxing plants.

NATURAL GAS EQUIPMENT INC.

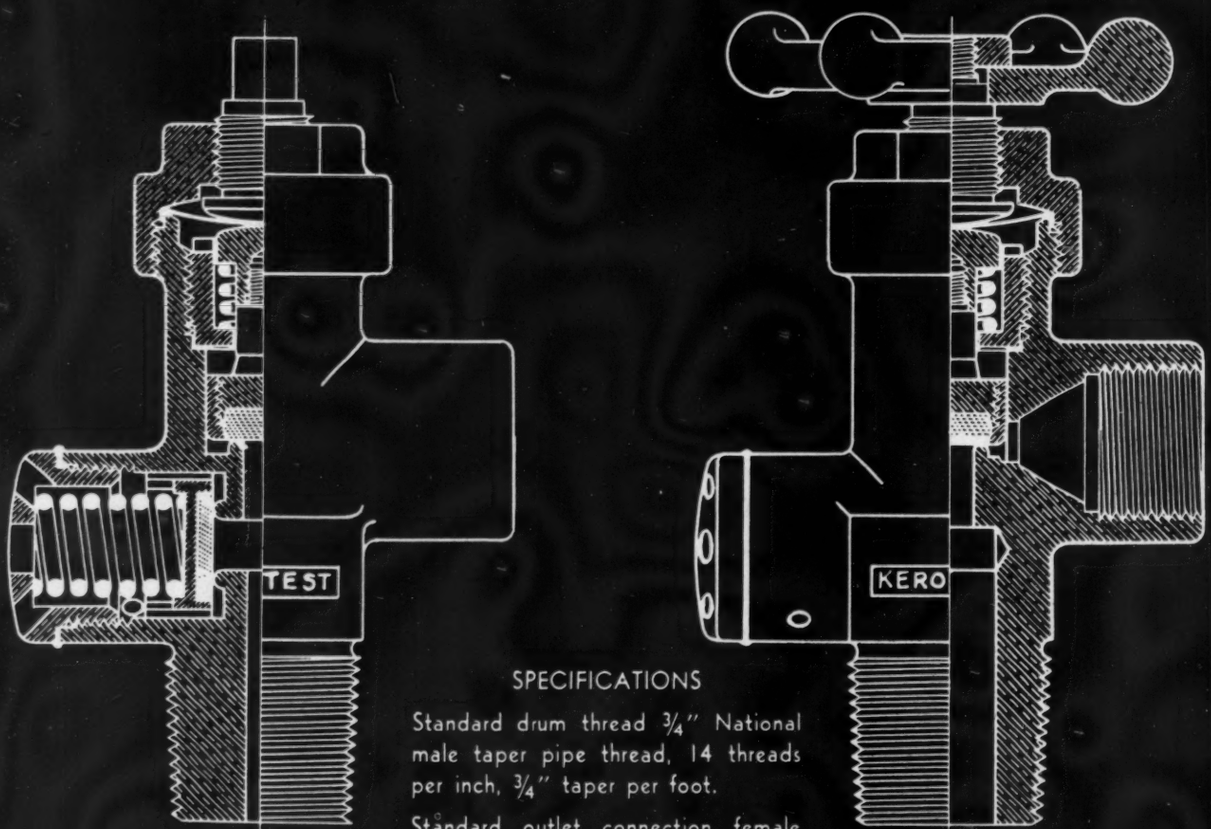
Petroleum Securities Bldg. Los Angeles	1123 Harrison Street, San Francisco	*Arizona Distributor:* Crane Co.

LOOK TO THE PIONEERS FOR CONTINUED LEADERSHIP

THE NEW KEROTEST LIQUEFIED PETROLEUM CYLINDER VALVE WITH SPRING SAFETY RELIEF

Diaphragm Packless Design

Conforms with all the rulings of the Bureau of Explosives for handling cylinders and drums containing inflamable liquids . . . provides positive pressure release . . . designed with clear openings for the escape of gases or liquids when pressures are built up beyond operating limits . . . automatically closes when excess pressure has been released, eliminating unnecessary waste of gas or liquid.



SPECIFICATIONS

Standard drum thread 3/4" National male taper pipe thread, 14 threads per inch, 3/4" taper per foot.

Standard outlet connection female left hand P.O.L.

TYPE 135A

With spring loaded safety release to operate at 175, 300 or 350 lbs. pressure per sq. in. as specified, and with stem squared 3/8" dia. for key operation.

TYPE 135

With spring loaded safety release to operate at 175, 300 or 350 lbs. pressure per sq. in. as specified and fitted with die cast white metal handwheel.

Quotations and detailed information furnished on request

KEROTEST MANUFACTURING COMPANY . . . . . PITTSBURGH, PA.

BUTANE-PROPANE NEWS

FIG. 1 (at left): Advertisement showing equipment used by a firm distributing bottled gas extensively in France. FIG. 2 (at right): Customer literature for a French butane product. Container holds about 30 pounds.

France Leads Europe's Bottled Gas Industry

By EMERIC KROCH

THE importance of the bottled gas industry in France can readily be appreciated by the fact that there are over 350,000 users of liquefied petroleum gas in that country—nearly 1 per cent of the population. This proportion is much higher than of any other country including the United States.

Reliable statistics are not available at this writing, but it is estimated that the average consumption per customer is around 100 pounds per year. This would put the yearly consumption of France at 35,000,000 pounds or 7,500,000 gallons. The reasons for this relatively low per capita consumption are to be seen in the high cost of bottled gas (18c American money per lb.) and in the fact, that liquefied petroleum gas is considered more as a standby and emergency fuel rather than the regular source of heat. In most of the French families the noon meal is the principal meal and even where city gas is available, it is usually prepared on the coal-heated range. City gas or bottled gas is mostly used for preparing breakfast and supper as well as for water heating.

The distribution of bottled gas in France on a large scale was started about three years ago by a company closely affiliated with a leading oil concern. One of its advertisements, reproduced in Fig. 1, shows distinctly the type of equipment used.

EMERIC KROCH, D.Sc. M. Inst. Petr. Techn., who contributes this article, has just completed a six weeks' trip throughout the United States. He is the head of the engineering firm "Etablissements Emeric Kroch" of Brussels, Belgium, and has been a frequent visitor to the United States.-*Editor*

Another company, sponsored by a world-wide oil corporation, started operations about a year ago. The equipment, quite similar to that mentioned above, is shown in Fig. 2.

Until now we have been speaking in general terms about bottled gas or liquefied petroleum gas without specifying the nature of the product distributed in France. Contrary to the practice in the United States and other countries of the Western Hemisphere bottled gas sold in France is *butane*. The average composition is 90 per cent n-butane, 8-9 per cent isobutane and a very small amount of propane.

It is obvious that such a product, which has a vapor tension of 30 pounds gauge at 70° F. and only 7 pounds at 32° F. would not be suitable for use outdoors. Although France on a whole enjoys a moderate climate, winters are usually cold and freezing temperatures frequent. The fact of the matter is that the product has been designed for use and is used inside the house.

It would be interesting to learn the Underwriters' reaction to this practice and more particularly in connection with the design of the equipment used. The standard French butane cylinder—and there are over 800,000 of them in use—is obtained by oxy-acetylene lap-welding (not brazing) of two dished heads to a shell made itself by welding.

The specifications are as follows:

Material used	12-14 gauge O. H. steel plate
Diameter	12 inches
Total height	28-30 inches
Water capacity	55 lbs.
Butane capacity	28-29 lbs.
Weight of cylinder empty	29-30 lbs.
Hydrostatic test pressure	225-275 lbs.

A square base spotwelded to the shell gives stability. Cylinder valves used have been both of the diaphragm and packed type. A screwed cap protects the valve during transport. *(Turn to Page 90)*

Mark Anton Buys Hudson Interest in Suburban Gas Co.

Mark Anton, of Suburban Gas Co., Verona, N. J., recently bought out the interest of Richard D. Hudson, his former partner in the company.

This gives Mr. Anton complete ownership of the company, distributing bottled gas in northern New Jersey and eastern Pennsylvania, with the exception of a small block of stock held by a third party.

Imperial Gas Co. Appoints European Distributor

Imperial Gas Co., Los Angeles, Calif., has appointed Dr. Emeric Kroch of Brussels, Belgium, as European distributor for its various products, including propane and isobutane. Shipments from Los Angeles to European ports are being made in cylinders, manufactured in Holland, of 3-ft. diameter and 8-ft. length. The company is also shipping in its own barrel-size containers.

Dr. Kroch is head of the firm known as Etablissements Emeric Kroch, headquartering in Brussels. He contributes an article to this issue of *Western Gas*, Page 69.

Hope Construction Consolidates Offices

The Newark and Pittsburgh offices of the Propane-Butane Division of Hope Construction and Refining Co. have been combined and will operate from 26 Broadway, New York, N. Y.

Due to design—due to workmanship—due to proper raw materials—Hackney Liquefied Petroleum Gas Cylinders stand two to one favorites.

Two to one—*all others combined.*

Hackney serves the leaders: Shell, Standard, Phillips, Hope, Skelly, etc.

Hackney cylinders for Butane, Propane, and Butane-Propane mixtures have been in the field from the first.

For other gases, Hackney cylinders serve: Frigidaire, Pennsylvania Salt, Mathieson, Virginia Smelting, and many others.

Hackney cylinders may be accurately called "supreme".

Hackney
MILWAUKEE

Pressed Steel Tank Company

208 S. La Salle St. Bldg. Room 1185 CHICAGO, ILL.
1363 Vanderbilt Concourse Bldg. NEW YORK, N. Y.
6633 Greenfield Ave. MILWAUKEE, WIS.
666 Roosevelt Bldg. LOS ANGELES, CALIF.

CONTAINERS FOR GASES, LIQUIDS AND SOLIDS

Utilities Giving Strong Support to Federal Housing Program

Federal Housing Administration releases covering installment sales by gas and electric utility companies give a total of $123,300,000 for home appliances sold in 1934, a decided increase over 1933. Estimates from the American Gas Association quoted in the report state that about $35,000,000 worth of gas appliances were sold in 1934, of which about two-thirds were on the installment plan. Virtually all utility companies were reported to be supporting the F.H.A. program.

El Paso, Sweetwater and Hamilton Staff Changes

L. M. Scholl, former division manager of the Community Natural Gas Co. at Sweetwater, has been named plant superintendent of the Texas Cities Natural Gas Co. of El Paso, a member of the Lone Star System.

R. H. Gray was transferred from the Hamilton plant to the Sweetwater plant of the Community Natural as division manager. L. D. Black succeeds Mr. Gray as division manager at Hamilton. R. N. Milson, former storekeeper of the company in Sweetwater, is now district manager.

W. E. Dawson of B. C. Electric Sales Staff Dies March 6

William Elliott Dawson, assistant merchandise manager, for the B. C. Electric Railway Co., Ltd., Vancouver, B. C., passed away March 6, following a brief illness. He was 56 years of age and an employee of the company since 1910, when he started as a member of the sales staff. He was promoted to showroom manager, and in 1914 was placed in charge of new business, being made manager of all B. C. Electric stores in 1926. Mr. Dawson was appointed to his present position in 1932.

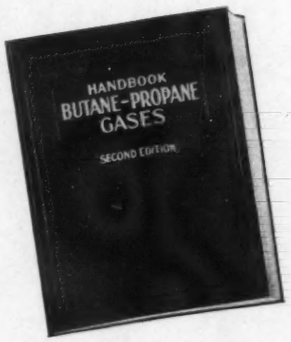
Recommend Replacing Frangible Disc Type Safety Devices

The Compressed Gas Manufacturers' Association, Inc., has issued a recommendation to owners of liquefied petroleum gas cylinders to replace all frangible disc type safety devices on cylinders for low pressure gases with other types of devices approved by the Bureau of Explosives. Copies of the complete recommendation may be obtained from the Association secretary, F. R. Fetherston, 11 West 42nd St., New York, N. Y.

Philgas Information Booklet for New Customers

A recently published "Handbook of Information on Philgas Service" is being distributed to new bottled gas users by the Philgas Department of Phillips Petroleum Co., Detroit. The contents cover such subjects as operation and care of gas ranges, the automatic oven heat control, cooking economies, service equipment, price schedules, other bottled gas services such as hot water and refrigeration.

The Only Handbook of Butane-Propane Gases



Big 2nd Edition

NOW READY — DETAILING THE REVOLUTIONARY DEVELOPMENTS OF THE PAST TWO YEARS!

This Table of Authoritative Contents Speaks for Itself!

SUMMARY OF DEVELOPMENTS: Brief review of progress during past two years since publication of first edition, including foreign expansion, new industrial uses, new manufacturing sources, new plant and equipment design, etc.

USE IN INTERNAL COMBUSTION ENGINES: A comprehensive discussion of liquefied petroleum gases in this important new use including engine design, comparison of propane and butane with other fuels, use in stationary engines, block testing automotive engines; use in rail cars, trains and locomotives; use in automotive engines; refrigerator cars and trucks; dirigibles and aeroplanes; utilization equipment such as carburetors and mixers, vaporizers, fuel tanks, valves and fittings, etc.; consideration of safety in relation to internal combustion engine use of these gases.

DESIGN AND INSTALLATION OF STORAGE: A fundamental chapter devoted to safe design of storage tanks. Application of the recently adopted A.P.I.-A.S.M.E. Code is thoroughly covered, and reference made to other pertinent regulations, including those of the National Fire Protection Association, the Industrial Accident Commission of California, and others. Discussion of special design problems is included, treating such phases as design of heads, reinforcement of openings, design of skid tanks, emergency relief provisions. Concluding the chapter is a valuable reminder list of essential precautions to observe in ordering storage tanks.

SUPPLY FROM PETROLEUM REFINERIES: Characteristics of refinery gases with reference to liquefied gas production. Detailed discussion of oil absorption and compression processes for liquefied gas recovery; fractionating columns; extraction of ethane from refinery vapor.

ENGINEERING DATA ON THE LOWER OLEFINS: A basic reference chapter consisting of tables on properties of liquefied petroleum gases produced from petroleum refineries—a companion chapter to that in the original Handbook on properties of the natural-gas-produced liquefied petroleum gases.

DOMESTIC APPLIANCE TESTING AND UTILIZATION: Separate discussions of undiluted and carbureted gases from the standpoint of their burning characteristics. Appliance testing procedure on liquefied petroleum gases, with special reference to American Gas Association methods. Fundamentals of appliance design for proper use of these gases. Latest A. G. A. Laboratory Approval requirements. Standards of construction and performance for gas appliance accessories.

ECONOMIC COMPARISONS WITH COAL, OIL, ELECTRICITY, PRODUCER GAS, MANUFACTURED GAS: Introductory section on requirements of a good fuel, available heat of gases, a list of applications for liquefied petroleum gases, relative advantages of propane and butane. A number of ready-reference charts show cost comparisons with other fuels as well as with electricity. Domestic, commercial and industrial comparisons are made in connection with each competitive fuel, and numerous tables present competing fuel cost data for special uses.

TOWN PLANTS: A new chapter combining discussion of butane-air and undiluted types of plants. Written from a practical operating standpoint and giving summarizing comment on a survey which covered every town plant now in operation. New types of plant equipment, and discussion of over-all plant design. Introductory section treats such pre-construction considerations as estimating market, sendout peak loads; plant location, plant structures. Major subject heads are: liquid storage, vaporization, undiluted plants air-mix plants (including description of various types of mixers), gas storage, distribution (system design, odorization, dehydration, conversion, etc.). The operating experience summary which concludes the chapter covers plant and distribution problems, consumer complaints, liquid cost, rates, classification of sales, collection experience, and minimum number of customers required to maintain a central plant property. Flow diagrams and many illustrations.

MANUFACTURE FROM NATURAL GAS: A new chapter dealing with the natural gasoline plant process, with special reference to operations involved in liquefied gas recovery. Flow diagrams assist in presentation of plant processes.

SPECIAL USES: Orchard heating, construction camp use, and various special applications such as cutting and welding.

VOLUME CORRECTION FACTORS: A series of original tables for temperature-volume corrections, ranging from 100° to 149° A.P.I. gravity, and from 20° to 119° F. Tables read both in degrees A.P.I. and specific gravity at 60° F. Also tables for converting specific gravity to degrees A.P.I., and vice versa. Preliminary discussion explains use of tables.

SUPPLEMENTS AND REVISIONS

A number of chapters in the first edition have been retained for the second edition, with additions and modifications made by their original authors to bring them in line with present knowledge. Late information is found in the Handbook on:

TRANSPORTATION: New material on motor truck and trailer design, describing typical equipment in use, pumps for loading and unloading, etc., current railway freight rates; requirements for shipping by water, etc.

USE WITH OTHER GASES: An added section on standby gas, also further discussion of reforming, use of propane for underfiring coke ovens, and use of butane or propane with coal gas under peak load conditions.

ANALYSIS AND TESTING: Specifications for commercial grades, test procedure for determination of specific gravity, water content, vapor pressure, etc. Detailed outline of analytical procedures for various gases and with various apparatus. The above and other additions have been made to the chapter on Composition and Analytical Determination.

PROPERTIES OF MIXTURES: Additional curves are included, among them those on dew points of butane, propane, and typical mixtures, carbureted with air; curves showing relation between B.t.u. and specific gravity.

BOTTLED GAS DISTRIBUTION: This chapter has been brought up to date, with sections on foreign sale of bottled gas, present trends in bottled gas merchandising, new types of service equipment being developed, design of propane bulk plants.

BIBLIOGRAPHY: This valuable feature of the first edition has been extended to list worthwhile material published during the past two years.

CENTRAL PLANT DIRECTORY: A new directory listing all town plants as well as semi-permanent plants on large construction projects; gives information secured directly from the companies on plant location, number of meters, type of service, plant capacity, rates, etc.

CATALOGUE SECTION: Current detailed engineering information on the many products now manufactured for service on butane and propane.

BUYERS' GUIDE: Revised commodity listings of firms supplying equipment, appliances, services for the liquefied petroleum gas industry.

SEND FOR IT TODAY!

HERE'S A HANDY COUPON

WESTERN GAS,
810 South Spring St., Los Angeles, Calif.

Send me the Handbook of Butane-Propane Gases (**Second Edition**), for 10 days' examination subject to approval or return. Within 10 days of receipt I will send $5.00, plus a few cents for postage and delivery, or return the book postpaid. (We pay postage on orders accompanied by remittance.)

Name..... Position.....

Company.....

Address..... City and State.....

Check for $..... enclosed. Date.....

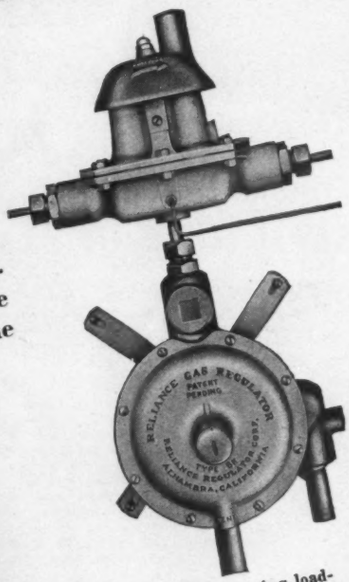
(Books sent on approval in U. S. and Canada only.)

REGULATORS YOU CAN RELY ON — RELIANCE — SINCE 1918 — TRADE MARK

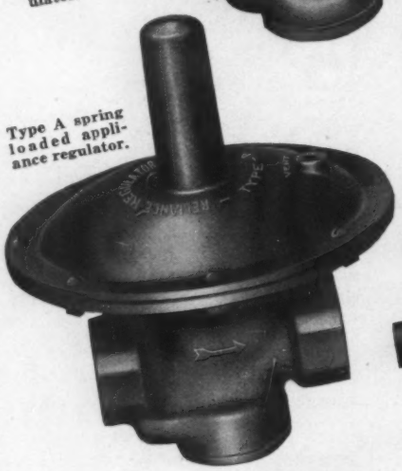
There's a Reliance Regulator for every class of service!

The Reliance organization builds a complete line of high and low pressure regulators for industrial, utility and household appliance gas control. Reliance Regulators are noted for their uniformity of pressure control in handling manufactured, natural or butane air gases. Write for descriptive circulars on the complete Reliance line.

Type A weight loaded low pressure appliance regulator.



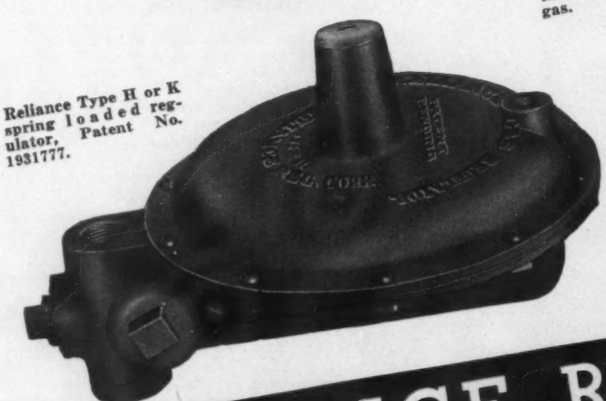
Type MR spring loaded primary regulator with Type BK secondary regulator, for butane hook-ups.



Type A spring loaded appliance regulator.

Reliance Type MC primary regulator for semi-industrial or commercial installations of butane or propane gas.

Reliance Type H or K dead weight regulator.



Reliance Type H or K spring loaded regulator, Patent No. 1931777.

RELIANCE REGULATORS

RELIANCE REGULATOR CORPORATION
1000 Meridian Ave. Alhambra, Calif.
Regulators for Manufactured, Natural and Butane-Air Gases

MEASUREMENT and CONTROL

Natural Gas Industry to Apply Data From the New A.G.A.-A.S.M.E. Measurement Report

By WM. MOELLER, JR.*

IMPROVEMENTS are still made in the business of large volume gas measurement both at high and low pressures.

The recollection of the following stages in the progress indicates the great strides that have already been made; namely, the proportional meter; the Pilot tube with its water column and static pressure gauge, both of which were read every 15 minutes; the original bomb type differential recording pressure gauge with its awkward manipulation procedure; the early orifice meters with the mercury type differential recording gauges; and so on to our present day highly efficient orifice meter installations.

The publication, in May, 1935, of the report of the joint orifice meter committee of the American Gas Association and the American Society of Mechanical Engineers, covering the measurement of gas through orifice meters, will mark the completion of an investigation which has been in progress for the past 10 years. The U. S. Bureau of Standards has participated in this work, and Dr. Buckingham and H. S. Bean of the Bureau's staff have made important contributions to the report.

The report will contain new orifice meter coefficients which will doubtless be generally adopted by the natural gas industry. These new coefficients do not differ widely from those now in use; however, the publication of this report will make possible a distinct improvement in the accuracy of orifice meter measurements, because discrepancies which now exist, under certain conditions, between the coefficients for flange- and pipe-connected meters, have been eliminated, and the experimental data upon which the new coefficients are based have been analyzed in accordance with fundamental physical laws and will be presented in such a way that the new coefficients can be applied with accuracy over a wider range of operating conditions than could the old coefficients.

The discharge coefficients now in use, and commonly referred to as "C_v" for pipe-connected meters, and "E" for flange-connected meters, have been replaced in the orifice meter equations in the new report by the product of three factors: the basic discharge constant, a Reynolds' number factor, and an expansion factor.

The Reynolds' number factor makes it possible to change the coefficient for changes in any of the variables that have been shown by fundamental analysis to have an effect on the coefficient. These variables are: diameter of the orifice, velocity of the fluid through the orifice, specific gravity, and viscosity of the fluid.

The expansion factor corrects for the change in density of the flowing fluid produced by the pressure drop across the orifice.

The committee's equation for the Reynolds' number factor contains the expression $\sqrt{h_w P_f}$, and the equation for the expansion factor reported by the committee contains the expression h_w/P_f, where h_w equals the differential pressure in inches of water, and P_f equals the absolute static pressure in pounds per square inch. The presence of these two variables in the orifice coefficient obviously tends to complicate the computation of orifice meter charts; however, this complication is not so serious as it might first seem. In the first place, under conditions normally encountered in commercial measurement, the Reynolds' number factor produces a very small change in the orifice meter coefficient; therefore rather large changes in $\sqrt{h_w P_f}$ have only a small effect on the coefficient. The expansion factor is much more important, especially in cases where gas is measured at relatively low pressures and with a fairly high differential. However, even in this case, tables have been provided by the committee which simplify the use of this factor, and the meter companies have developed a device for measuring the static pressure in such a way that the expansion factor can be entirely eliminated. This device makes it possible to measure a pressure which lies between the up- and downstream static pressures, and which differs from the upstream static pressure by a fixed percentage of the differential pressure. The device can be adjusted for any desired percentage. For a given ratio of orifice to pipe diameter, a fixed percentage can be selected which will eliminate the expansion factor.

Anticipating the publication of the A.G.A.-A.S.M.E. report, the Pacific Coast Gas Association, the California Natural Gasoline Association, and the Southern California Meter Association have organized a joint committee for the purpose of preparing and publishing a revised bulletin of standard practice for the measurement of natural gas through orifice meters in the State of California, based on this A.G.A.-A.S.M.E. report. This revised bulletin will contain the new coefficients re-computed on a 14.73 lbs. per sq. in. basis (the standard pressure to which all natural gas measurements through orifice meters are referred in California), together with all the other data required for computing orifice meter coefficients, and will specify in detail the methods to be used in computing and applying these coefficients. It is expected that when the revised bulletin of the California committee is published, it will be generally adopted and used by all California companies.

Upon the release of what is known as Measurement Report No. 2 of the A.G.A., Natural Gas Department Measurement Committee, at the current Memphis convention, it is expected that the new orifice meter data will come into general use throughout the natural gas industry.

*Mr. Moeller is vice-president of the Southern California Gas Co., in charge of natural gas production and transmission, and has served on the A.G.A. Natural Gas Department's Measurement Committee since its organization. He is vice-chairman of the Natural Gas Department, and president of the Pacific Coast Gas Association.—*Editor.*

Standard Gasoline Co. Program Enjoyed by S. C. M. A.

STANDARD Gasoline Co. sponsored the April meeting of Southern California Meter Association, with C. B. Heartwell introducing the program features. The meeting was held at Lakewood Country Club, Long Beach.

President Edgar Wilde opened the business meeting by introducing P. W. Hill who as a member of the joint committee on new orifice meter data, representing the Pacific Coast Gas Association, Southern California Meter Association, and the California Natural Gasoline Association, reported upon the field covered in the committee's work, which is now well under way.

Mr. Heartwell, who arranged for the Standard Gasoline Co. contributions, first introduced W. C. Dayhuff who discussed some current work on Boyle's Law deviation vs. specific gravity. Mr. Dayhuff is chairman of Committee No. 1 for the C. N. G. A. which is carrying on projects on Boyle's Law deviation, standard procedure for determining specific gravity of gases, etc.

The second speaker was Lawrence Bonner who gave a discussion of meter calibration, which will appear in a future issue.

Graham V. Moody of the Standard Oil Co. of California geological department concluded the meeting with an interesting talk on the nature and causes of earthquakes. His remarks were illustrated by numerous lantern slides of earthquake destruction, and an apparatus for demonstrating vibration periods of structures in connection with designing buildings to resist earthquakes.

Wisconsin Utilities Association Officers Renominated for 1935

The Nominating Committee of the Wisconsin Utilities Association has nominated the following men to serve as officers of the Association for the coming year:

President—G. V. Rork, Northern States Power Co.

Vice-President—F. A. Coffin, The Milwaukee Electric Railway and Light Co.

Treasurer—C. E. Kohlhepp, Wisconsin Public Service Corp.

Chairman, General Section—Henry J. Dropp, Milwaukee Gas Light Co.

Vice-Chairman, General Section—R. M. Houger, Wisconsin Hydro Electric Co.

All present officers of the Association, with the exception of Mr. R. O. Jasperson, have been renominated. Mr. Dropp was substituted for Mr. Jasperson, who requested that he be relieved from the duties of the office.

New Bill Insert Published by North Shore Gas Co.

North Shore Gas Co. of Waukegan, Ill. is beginning the publication of a new monthly bill insert under the name of "Modern Home News for Today's Homemaker." One of the features of the news sheet will be the payment of $2.00 for recipes that are published in it. Rodger K. Tenney, head of the advertising department of the company, has charge of the publication.

5 REASONS WHY YOU SHOULD USE ARCCO CHARTS

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5 LOW COST — Prices are based on your annual requirements; deliveries made as specified. You make a definite saving.

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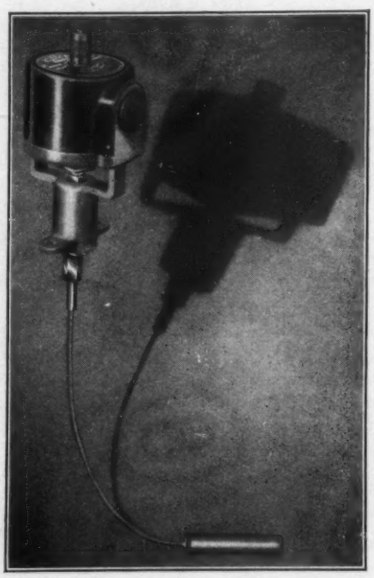
LOS ANGELES, CALIFORNIA

ARCCO
MODERN CHARTS FOR MODERN CONDITIONS

New Klixon Control Placed on Market By Spencer Thermostat Co.

THE Spencer Thermostat Co., Attleboro, Mass., has placed on the market a new pilot safety device for electrically controlled gas-fired furnaces and heaters, known as the Klixon Type C-1888 Pilot Safety Switch. This device, illustrated above, is a gas pilot



safety control designed for use with automatically operated gas valves that operate to close the gas valve should the pilot flame become extinguished.

The safety pilot control consists essentially of a bellows operated by a bulb constructed of a special alloy steel. This assembly is filled with an inert gas under pressure and expands when the bulb is heated by a pilot flame to exert pressure against the Klixon disc and switch assembly. The switch must be closed manually since the expansion of the liquid does not exert sufficient pressure to close the switch. Upon extinguishment of the pilot the Klixon disc operates to open the contacts of the switch assembly and by so doing the electric valve is closed and shuts off the gas supply.

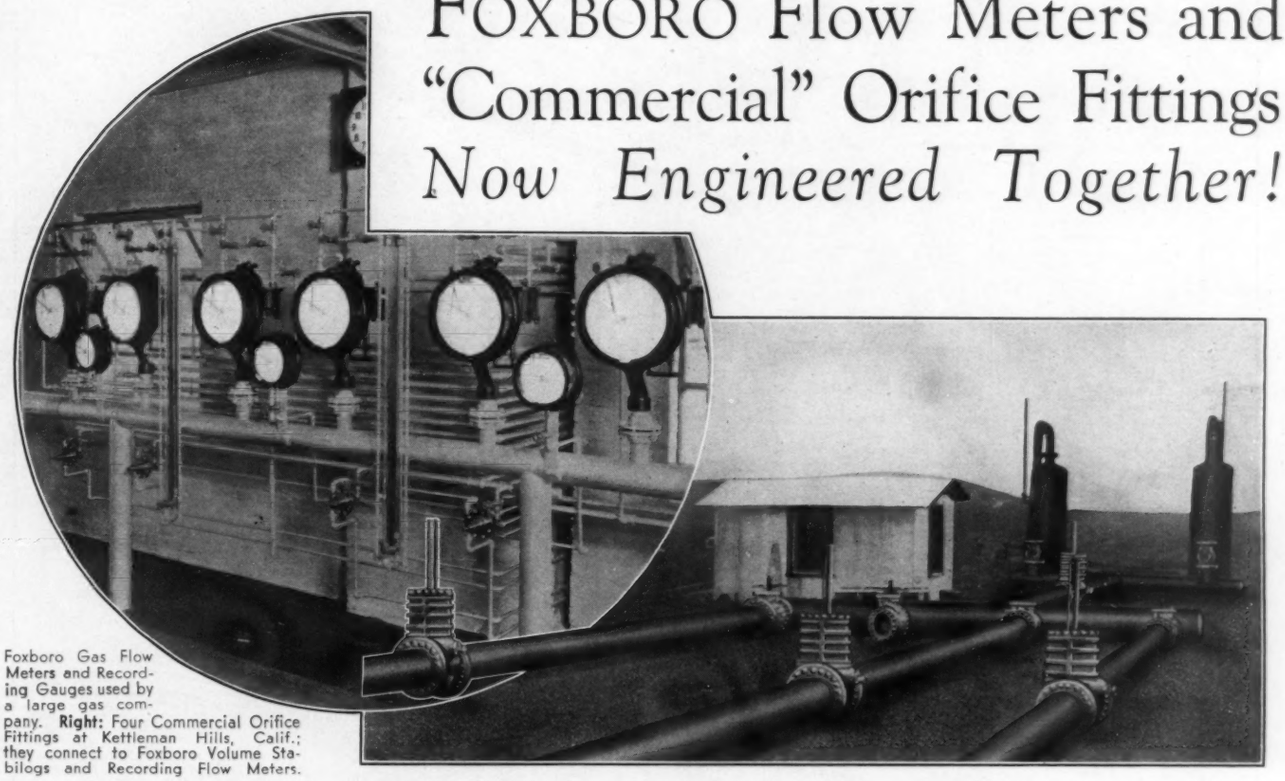
This device is designed to provide safe operation of the gas appliance when used in conjunction with an automatic gas valve which may or may not be thermostatically operated when properly installed and wired. The device is rated at ¼ h.p., 110 volts a.c., 5 amperes or 2.3 amperes at 110 volts d.c. The safety control consists of a bulb and bellows assembly, body assembly, switch contact assembly, and cover. For low-voltage operation a composition bushing is provided in the conduit opening in the frame.

Seattle Gas Co. Cooking School Plays to Capacity Houses

Seattle Gas Co. sponsored a three-day cooking school April 3, 4, and 5, which was held in a large downtown theatre, and turned people away each day for lack of seating capacity. The school opened the company's participation in the A.G.A. National Gas Range Contest.

Another Step UP in Gas Metering!

FOXBORO Flow Meters and "Commercial" Orifice Fittings *Now Engineered Together!*



Foxboro Gas Flow Meters and Recording Gauges used by a large gas company. **Right:** Four Commercial Orifice Fittings at Kettleman Hills, Calif.; they connect to Foxboro Volume Stabilogs and Recording Flow Meters.

NOW FOXBORO becomes exclusive distributors of Commercial Orifice Fittings. Thus the world-wide engineering facilities of Foxboro are placed at the command of gas meter users in obtaining the advantages of these Orifice Fittings.

You're "missing something" if you don't know of the time, trouble and real money Commercial Orifice Fittings can save you. They eliminate leaks and by-passes — think of the nuisance and expense that alone saves you. The threaded elevator enables you to lower or lift the orifice plate quickly, easily and safely without shutting down the line—regardless of line pressure. That **invites** frequent inspection of the orifice. In addition:

Orifice plate seating mechanism is positive, easily operated, cannot warp orifice;

Lubricant-sealed valve will not stick, can not grind itself rough and cause leaks;

Tight orifice plates pulled loose easily by the elevator;

No packing of set screws, because no set screws in the pressure areas.

Of course, Commercial Orifice Fittings are adapted for steam, air, oil and water as well as gas. Full range of sizes, for high or low working pressures. **Write for complete details.**

FOXBORO
REG. U. S. PAT. OFF.
THE COMPASS OF INDUSTRY

The Foxboro Company, Foxboro, Mass., U. S. A.
Branches in Principal Cities, Agents in Foreign Countries
SOLE DISRIBUTORS OF COMMERCIAL ORIFICE FITTINGS
(Mfd. by Commercial Iron Works of Los Angeles, California)

. . . COMPLETE INSTRUMENTATION FOR THE OIL AND GAS INDUSTRY . . .

RUST IN PEACE
TEA! Hummph! That was the least of my troubles. They expected me to furnish hot water for everything from Father's sunrise shave to Junior's bed-time ablutions. No wonder I broke down. But the family nearly broke up before they—
I KNOW. Went modern. So did mine, but not until I'd spent years inside the furnace. I got even, though. Added as much as 25 per cent to their fuel bills. (Ha, ha! They thought I was saving money.) And in summers, when the furnace was out, they had to take cold showers and heat wash-water in a boiler.
WHAT reward did I get for two generations of faithful service? I'll tell you: abuse and complaints in my old age! But even my iron constitution couldn't endure forever. Well, at last they've put one of my grandsons on the job . . as efficient a young modern as ever honored the name of Gas. If all homes were modernized, we'd have a lot more company in the junk yard!
Retire that old veteran, and enlist a new AUTOMATIC GAS water heater—the most efficient and economical appliance for the purpose ever devised. Now available on the lowest monthly terms ever offered, or through an FHA modernization loan.
For a few cents a day, enjoy the happy convenience of instant hot water . . . clear, steaming abundance . . . for kitchen, bath and laundry . . at a touch of the faucet. That's real comfort!
Perfected new models—either storage type (illustrated) or instantaneous—are displayed by your appliance dealer, plumber or gas company. Inspect and price them today.
Quick Clean Economical
Gas
the modern fuel
PACIFIC COAST GAS ASS'N, INC.
Advertisements prepared under the direction of the Cooperative Advertising Committee, Publicity and Advertising Section, P.C.G.A.
A Stream
FLOWS THROUGH YOUR HOUSE . . . .
60% OF IT SHOULD BE
HOT WATER
Many homes use 10,000 gallons of water a month, including lawn and garden requirements.
Your family probably uses at least 5,000 gallons monthly, within the house.
Sixty per cent of this "stream" that flows through kitchen, bathroom and laundry faucets, authorities say, should be hot . . . for cleanliness, convenience, comfort . . . and most of all, for health.
In "tea-kettle" homes, or those with old-fashioned water heaters, the family often compromises on cold water.
But in modern homes, with gas automatic water heaters, hot water is always instantly "on tap" . . . fresh, clear and steaming, at a turn of the faucet.
Family health is protected. Clothing lasts longer. Housework is lightened. Everyone is happier, more contented. One of life's greatest comforts is made possible by the modern fuel, GAS.
GAS AUTOMATIC WATER HEATING IS THE MOST ECONOMICAL MODERN METHOD KNOWN
Purchase price and operating cost total but a few cents a day. Modest terms . . . or a modernization loan under the Federal Housing Act.
See your plumber, appliance dealer or gas company today.
Gas
the modern fuel
GAS ASSOCIATION, INC.
service organization of
Company is a member
EET, SAN FRANCISCO
THE SUN NEVER SETS ON
"SUNSET"
NOR ON THE GAS INDUSTRY'S
LOAD-BUILDING ADVERTISING

"SUNSET," the Pacific Coast's only general family magazine, exerts a powerful influence . . . month after month, year after year . . . upon 200,000 better class urban and suburban homes.

Similarly, the cooperative load-building advertising of the Gas Industry, appearing continuously in Pacific Coast publications for six years, exerts its unwavering "pull" towards profitable gas appliance sales.

Every one in the industry, from the largest utility or manufacturer to the smallest retail appliance dealer, profits directly or indirectly by this advertising.

Illustrated, in reduced size, are two recent advertisements on GAS AUTOMATIC WATER HEATERS, published respectively in the March and May issues of Sunset Magazine.

Pacific Coast Gas Association **447 Sutter Street, San Francisco**

With the ASSOCIATIONS

Cleveland Distribution Meetings Offer Full Program

AS this issue of *Western Gas* comes from the press, the 12th Annual Distribution Conference, sponsored by the Distribution Committee of the American Gas Association, goes into session (May 2-4) at Cleveland, Ohio. Erick Larson, Long Island Lighting Co., New York, N. Y., is chairman of the Distribution Committee.

A major feature of the meeting is a visit to the A.G.A. Testing Laboratory on May 3.

Among the papers being presented at the Conference are the following:

Main Extension Fittings—W. M. Henderson, superintendent of gas distribution, Los Angeles (Calif.) Gas and Electric Corp.

Appliance or Low Pressure Regulators—F. O. Suffron, research engineer, A.G.A. Testing Laboratory, Cleveland, Ohio.

Rubber Compounded Gaskets for Pipe Joints and Clamps—K. R. Knapp, A.G.A. Testing Laboratory, Cleveland, Ohio.

The Public Utilities Survey Commission of Pittsburgh, Pa.—R. W. Miller, Hope Construction and Refining Co., Pittsburgh, Pa.

Latest Developments in Portable Equipment—Earl H. Eacker, assistant engineer of distribution, Boston (Mass.) Consolidated Gas Co.

Service Regulator Testing—Allen D. MacLean, chief engineer, Pittsburgh (Pa.) Equitable Meter Co.

Factors and Trends in Meter Maintenance—R. W. McClenahan, assistant manager, American Meter Co., Philadelphia, Pa.

The Need for Improving the Performance of Customers' Meters from the Customers' Standpoint—H. B. Andersen, engineer of distribution, The Philadelphia (Pa.) Gas Works Co.

Effect of Sales Policies on Distribution Employee Training—T. J. Perry, superintendent, customers' service division, The Brooklyn (N. Y.) Union Gas Co.

Installing and Servicing Appliances—H. D. Lehman, superintendent, customers' service division, The Philadelphia (Pa.) Gas Works Co.

Reports being made at the sessions included those from the following subcommittees:

Pipe Coating and Corrosion—C. F. Turner, East Ohio Gas Co., Cleveland, Ohio, chairman.

Meters and Metering—David P. Allen, Washington (D. C.) Gas Light Co., chairman.

Pipe Joints—A. H. Anderson, Detroit (Mich.) City Gas Co., chairman.

Cast Iron Pipe Standard—C. C. Simpson, Jr., Consolidated Gas Co. of New York, N. Y., chairman.

Dr. Scott Ewing, research associate, U. S. Bureau of Standards, Washington, D. C., is also scheduled for a report.

Another outstanding feature of the 12th Annual Distribution Conference is the series of six dinner meetings which are being held, with the following men acting as discussion leaders on the subjects shown:

Pipe—F. M. Goodwin, Boston Consolidated Gas Co.

Meters—J. D. von Maur, Consumers Gas Co., Toronto, Ontario, Canada.

Customers' Servicing and Appliance Installation—F. C. Weber, The Brooklyn (N. Y.) Union Gas Co.

Change-over from Manufactured to Natural Gas—H. E. Bates, The Peoples Gas Light & Coke Co., Chicago, Ill.

Safety Practices—H. W. Alrich, The Consolidated Gas Co. of New York, New York, N. Y.

The dinner conferences will occur simultaneously, each group being assigned a private dining room.

Calendar

May

Natural Gasoline Association of America—Annual Convention, Hotel Tulsa, Tulsa, Okla., May 1-3.

A. G. A. Annual Distribution Conference—Cleveland Hotel, Cleveland, Ohio, May 2-4.

A. G. A. Natural Gas Department—Hotel Peabody, Memphis, Tenn., May 6-9.

A. G. A. Joint Conference of the Production and Chemical Committees—Hotel New Yorker, New York, N. Y., May 13-14.

American Institute of Chemical Engineers—Wilmington, Dela., May 13-15.

June

State Utility Commission Engineers—National Bureau of Standards, Washington, D. C., June 6-8.

Public Utilities Advertising Association—Chicago, Ill., June 9.

Canadian Gas Association—Annual Convention, Montreal, Quebec, Canada, June 10-11.

American Society of Mechanical Engineers—Semi-Annual Meeting, Hotel Gibson, Cincinnati, Ohio, June 19-21.

Michigan Gas Association—Annual Convention, Hotel Pantlind, Grand Rapids, Mich., June 20-22.

American Home Economics Association—Annual Meeting, Chicago, Ill., June 24-28.

July

P.C.G.A. Northwest Regional Conference—Tacoma, Wash., July 11-12.

August

American Chemical Society—Annual Meeting, San Francisco, Calif., week of August 19.

September

Pacific Coast Gas Association—Annual Convention, Hotel Huntington, Pasadena, Calif., September 17-19.

October

American Gas Association—Atlantic City, N. J., October 14-18.

November

American Petroleum Institute—16th Annual Meeting, Biltmore Hotel, Los Angeles, Calif., November 11-14.

Mid-West Gas School and Conference—Iowa State College, Ames, Iowa.

F. H. Brooks Elected President Mid-West Gas Association

F. H. BROOKS, vice-president and general manager of the Northern Natural Gas Co., Omaha, Neb., has been elected president of the Mid-West Gas Association for the ensuing year. Others elected to serve with him are H. M. Smith, Iowa Public Service Co., Waterloo, Iowa, 1st vice-president; E. J. Boyer, Minneapolis Gas Light Co., Minneapolis, Minn., 2nd vice-president; R. B. Searing, Sioux City Gas & Electric Co., Sioux City, Iowa, secretary-treasurer.

F. H. Brooks

Attendance at the 30th annual convention of the Association numbered over 250, the largest convention ever recorded by the Association, according to R. B. Searing, secretary-treasurer.

Gas Range Week Set for April 27—May 4

Gas Range Week, conducted by the Gas Appliance Society of California, will be held during the week, April 27—May 4, 1935. The campaign was originally planned for an earlier date, but was postponed because of plant labor troubles which might have interfered with deliveries to dealers.

Covering the northern half of California, with Bakersfield as its southern limit, the Gas Range Week campaign will be supported by radio and billboard advertising, dealer cards and window displays. Principal feature of the campaign will be the offer of free oven thermostats with ranges bought during the sale, a saving to the purchaser of $16.00.

New Waxahachie Offices

The southern division of the Municipal Gas Co. has moved into its new quarters in the Gibson Building, Waxahachie, Texas. The building was completely remodeled to accommodate the new tenants.

1934 Oil and Gas Operations in Rocky Mountain Area

"Rocky Mountain Oil and Gas Operations for 1934" is the title of an 85-page publication issued by Petroleum Information, Inc., Continental Oil Building, Denver, Colo. C. A. Schoenfelt is editor of the book, which deals with oil and gas field discoveries and extensions, failures, drilling wells, well completions, oil and gas pipe lines, gasoline lines, refineries and packing plants, and crude oil production data for the Rocky Mountain area.

P. G. and E.'s Sales-Service-Survey Program

(Continued from Page 51)

1. Market analysis. Survey data should be recapped by zones, segregating metropolitan areas from smaller cities and further segregating residential consumers from those in flats and apartments.

2. Study of sales trends including progress made in the sale of new equipment or replacement sales; also progress made through the sale of competitive equipment.

3. Sales planning by utility sales management; data available being used to design sales programs from year to year and determine sales policies so that for the money and effort expended, results may be obtained along the lines desired.

4. Sales campaigns can be organized in cooperation with dealers, the type of appliance, prices, and nature of selling offers being formulated to reach the market desired in line with the customer buying power in any given area.

5. Relations with dealers in the gas appliance trade can be improved through sales promotional campaigns of the type referred to and by making available market analysis and survey data, as well as making available, through the allocation plan, all prospects developed for equipment not sold by the gas company.

6. *Direct-by-Mail.* Survey cards can be used to cover prospects in any given area according to code system of checking.

7. Analysis of service and customer relations prevailing in various districts can be made to enable utility to strengthen its service policy as may be required.

8. Rate studies, especially formulation of inducement rates, can be made, based upon customer survey data.

Promotions in Lone Star Advertising and Public Relations Department

W. C. Grant, advertising and public relations director of the Lone Star Gas Co., has announced the following promotions and changes in his staff: W. G. Wiegel, formerly assistant advertising manager, is announced as advertising manager; Albertine Berry becomes home economics director; Thomas R. Thompson is in charge of public information; Bruce Cunningham, editor of "Blue Blaze;" Margaret Marable in charge of home economics promotion; C. I. Langdon in charge of floor displays; Mrs. Leslie Caldwell, librarian.

Utility Investors Federation Issues Official Organ

The American Federation of Utility Investors, Inc., Chicago, Ill., on May 1 issued the first number of its official organ known as "Investor America." Highlights of the testimony submitted by Dr. Hugh S. Magill, president of the Federation, opposing the Wheeler-Rayburn Bill before Congressional Committees in April testimony, are featured in the first issue.

YOU CAN ENJOY YOUR FAVORITE SPORT

at

SANTA CRUZ

Golf . . . tennis . . . riding . . . hiking . . . swimming . . . motoring . . . fishing . . . boating . . . or just "lazing" on the sunny sands . . . whatever you enjoy most will find its ideal setting at Santa Cruz. Plan now to bring your family and spend your vacation with us.

Coast Counties Gas and Electric Company

MODERN METHODS AND MATERIALS

A letter to WESTERN GAS will bring you any of the selected reference bulletins listed below, without cost. Indicate by number which you desire.

NO. 61—GAS REGULATORS

Catalogue on full line of regulators for natural and manufactured gas. 76 pages including capacity data and specifications.

NO. 62—REPAIR CLAMPS

Catalogue on line of pipe repair clamps and saddles for steam, water, gas, oil, ammonia or brine lines. Items include clamps for pipe lines, pipe joints, collar leaks, bell joints, split coupling, high pressure welds, services, together with various types of saddles, pipe benders, and reseaters. 32 pages. Illustrated.

NO. 63—BI-METAL CONTROLS

Booklet describes 10 different types of laminated material for control devices made by fusing two sheets of metal, one of high thermal expansion and the other low. Data on temperature range, deflection constant, thickness, etc.

NO. 64—BUTANE APPLICATIONS

Reproductions of approximately 30 photographs of butane conversions and applications, particularly for internal combustion engine use, including trucks, tractors, construction equipment, storage facilities, etc. Index and description of each application. 16 pages in looseleaf form.

NO. 65—COMPRESSORS

Line of two-stage air-cooled compressors described and illustrated; also information on air tools. 30 pages.

NO. 66—PIPE FLANGES

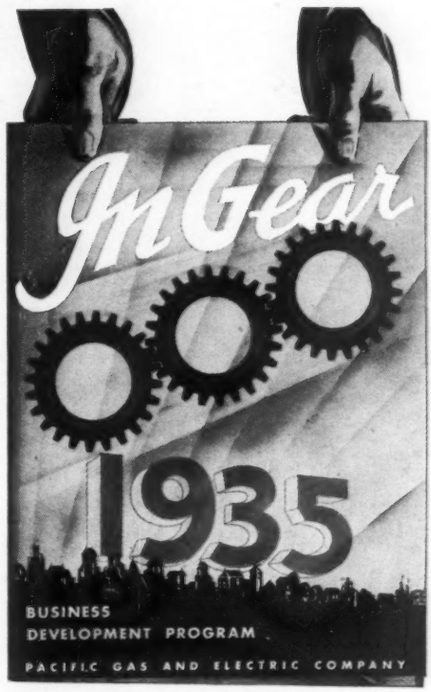
Application of line of forged steel flanges covered in 96-page catalogue. Facts on joint bolting, gaskets, bolted flanged connections, standard specifications, list prices and weights, standard flange facings, pressure-temperature ratings, thread standards, orifice flange unions, machine bolts, boiler flanges. Also covers seamless steel fittings for welding. Numerous reference tables.

NO. 67—SOLENOID VALVES

Catalogue on line of solenoid operated valves for automatic and remote control of air, gas, steam, liquids. General service recommendations. Sections on control and connections, safety shut-off valves, trip valves, packless type valves, low pressure packed type, adjustable main flow valves, adjustable by-pass valves, and numerous other types. 24 pages, illustrated.

IT'S OFF THE PRESS

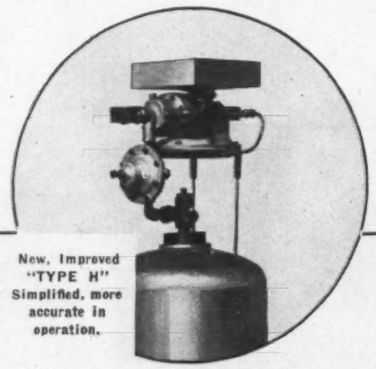
A COMPLETE ILLUSTRATED PLAN BOOK OF SALES PROMOTIONAL ACTIVITIES FOR COMING YEAR



P. G. & E.'s far-flung territory — its cities and towns, its people, its buying power • A vital message from President Hockenbeamer • An analysis of present conditions • "What the Future Holds" — authoritative facts and figures, shrewdly interpreted • The markets for individual appliances • A complete statement of P. G. & E. sales Policy • What the company does and does not sell—and why • Merchandising opportunities in "Half-off on Extra electricity" • A keen appraisal of "Better Light-Better Sight" potentialities • The Gas and Electric Appliance Societies — their accomplishments and objectives • A calendar of 1935 promotional events • A massed parade of P. G. & E. advertising • The "Selling Job for 1935" • "The Mobilization of an Industry" • and in a pocket in the back cover — "Operating Details of the 1935 Business Development Program" — a book you will want to keep at your elbow throughout the coming year. • "In Gear" is the whole story of Gas and Electric Appliance promotion—in advance • The monthly Dealer Bulletin will supply the last-minute details • Together, they constitute a working plan that should keep you profitably busy • "In Gear" and its supplementary manual "Operating Details" will be distributed thru our local offices • Don't merely read them — *use* them! They are your tools.

P • G • and E •
PACIFIC GAS AND ELECTRIC COMPANY
Owned, Operated, Managed by California

WG205-535



New, Improved "TYPE H" Simplified, more accurate in operation.

GASAIR

By-pass Eliminator

STANDBY UNIT

for Bottled Gas

This sturdy emergency-unit, **absolutely dependable,** screws firmly into regular tank valve, and is stoutly braced. Easily transported, and handled by one man.

Furnishes a propane-air mixture that temporarily replaces either natural or manufactured gas **without necessitating burner adjustments.**

Indispensable to gas companies! Insures better service to customers. Saves time. **Costs less than running a by-pass.**

Clip this ad and send for prices, full particulars

Utility Development Co.

John K. Heller, President

5815 Third Street San Francisco

Electrogas

FLOOR FURNACES

NEW LOW PRICES

now available on the famous ELECTROGAS FLOOR FURNACES. These prices are the lowest ever offered, and are created to make it especially worth your while to sell Electrogas heating in line with the Federal Government's plan of home modernization.

ALSO AVAILABLE IMPROVED LINES OF "STREAMLINED" BASEMENT FURNACES.

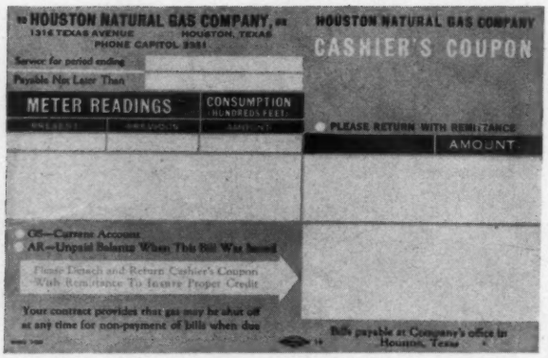
BLOWERS FILTERS AIR WASHERS

BUILT-IN FURNACE—BLOWER—FILTER UNITS

Write for details.

ELECTROGAS FURNACE & MFG. CO.

2575 Bayshore, San Francisco
164 South Central, Los Angeles


HOUSTON NATURAL GAS COMPANY
1316 TEXAS AVENUE HOUSTON, TEXAS
PHONE CAPITOL 2381
Service for period ending
Payable Not Later Than
METER READINGS
CONSUMPTION
HUNDREDS FEET
HOUSTON NATURAL GAS COMPANY
CASHIER'S COUPON
PLEASE RETURN WITH REMITTANCE
AMOUNT
OS—Current Account
AR—Unpaid Balance When This Bill Was Issued
Please Detach and Return Cashier's Coupon With Remittance To Insure Proper Credit
Your contract provides that gas may be shut off at any time for non-payment of bills when due
Bills payable at Company's office in Houston, Texas

Customer's Bill in New Dress Improves Collections

Houston (Texas) Natural Gas Co. has recently introduced a new form of customer's bill, illustrated above. In the actual bill the lightest portions shown in the illustration are white, the intermediate tone is blue, and the darkest portions are black as in the illustration. The chief attraction of the new bill, according to George D. Wilson, advertising manager of the company, is the ease with which it can be read and understood. An improvement in collection and customer contact has been definitely traced to this new and attractive type of bill. The colors attract more attention than the plain card, and the bill is less likely to be ignored, in the Houston Natural Gas Co. experience.

A. C. Colby Elected President Gary Electric and Gas Co.

A. C. COLBY, widely known transportation executive, has been named president of the Gary Electric and Gas Co. and its operating subsidiary, the Gary Heat, Light & Water Co.

In addition to the presidency of the Gary Heat, Light & Water Co., Mr. Colby also is general manager of the company. George N. Rooker, vice-president and general manager of the operating company, resigned April 1. Mr. Colby has been in the transportation branch of the utility business since 1900, starting with the old Union Railroad company in Providence, R. I. In 1908 he went to South Bend with the old Chicago, South Bend and Northern Indiana railway. In 1910 he went to the Birmingham Railway, Light and Power Co., and for two years served in an operating capacity with that company. He then was with the Birmingham, Ensley and Bessemer Railway company for a short time on the construction of new railroad lines, after which he was called back to Pittsfield, Mass., to take charge of operations of the Berkshire Street Railway Co., a subsidiary of the New York, New Haven and Hartford railway.

A. C. Colby

During the World War he was sent to Bridgeport, Conn., to rehabilitate the railroad there in order to better serve arms and other works which were situated there. In 1920 he took charge of the rolling stock of the Connecticut company, a subsidiary of the New York, New Haven and Hartford railway in that part of New England. A short time later he was one of the men selected to take charge of the municipal railway in Detroit, Mich., the largest municipal street railway company in the country, and was there for 11 years, being superintendent of equipment when he resigned. In October, 1931, he was chosen to take charge of the Chicago and Calumet District Transit company, and the Gary railways.

Officers of the Gary Electric and Gas Co. elected March 28 are John N. Shannahan, Indianapolis, chairman of the company; Mr. Colby, president; G. C. Ellis, Chicago, vice-president; Philip J. Ryan, Chicago, secretary and treasurer; Alfred E. Jost, Chicago, comptroller, and B. R. Nightingale, assistant secretary and assistant treasurer.

Officers of the Gary Heat, Light & Water Co. elected April 9 are Mr. Shannahan, chairman of the company; Mr. Colby, president and general manager; L. W. Simmons, auditor and assistant treasurer, and Miss Ethel Lindwall and Miss B. R. Nightingale, assistant secretaries.

J. C. Hicks New Business Mgr. for Charles City Gas Co.

Appointment of Jess Cutler Hicks as new business manager of the Charles City Gas Co., Charles City, Iowa, has been announced by L. A. Lanke, division manager of the Northwestern Illinois Utilities Co. Mr. Hicks became associated with this organization March 1, and moved to his new location, Charles City, on March 15.

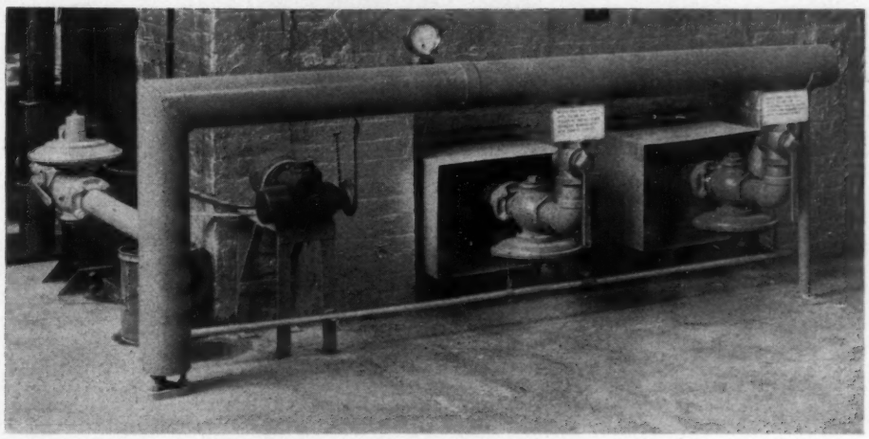
The appointment was the initial step in a widespread program of merchandising gas appliances, sponsored by the company, and has been followed by remodeling the company office at Charles City, and the taking on of a new line of gas ranges, water heaters, and refrigerators.

Mr. Hicks is a graduate of Los Angeles High School and the University of California, having received his B.A. degree in February of 1934.

There is a DIFFERENCE

At the right is shown an installation of two number 6-L Webster Low Pressure Radiant Burners, equipped with Weco Series 1 Precision Combustion Control.

There is a wide variety of types and sizes of Webster burners from which to choose the correct equipment.



● *When purchasing gas burning equipment you naturally and logically want to choose the manufacturer who can serve you from a broad background of experience. You want no recommendations made on supposition.*

The Following Example

is a specific instance of the logical selection of *experience.* A specific instance of this is an installation in the Chicago area consisting of 4-500 Hp. and 7-450 Hp. boilers converted from oil to natural gas to develop 1200 B.Hp. on the 500 Hp. boilers and 1000 Hp. on the 450 Hp. boilers. Other burner manufacturers proposed lowering furnace floor and installing conventional type burners. This necessitated shutting down of boilers, resulting in a deficiency of steam. A Webster Survey recommended no change to furnace, utilizing part of present oil burners and equipment by using specially designed gas inserts at a cost of only *one-fourth* of competitive recommendation. Result, *gas contract signed quickly,* installation made by Webster without any change to furnace, no shut down, capacity guarantee met, efficiency guarantee met, *a satisfied customer and revenue* started for Gas Company quickly. Name of installation on request.

THE WEBSTER ENGINEERING COMPANY

QUALITY EFFICIENCY SERVICE *with* SPEED

The Webster Engineering Company has the necessary *background of experience* to give you a positive guarantee of performance. This experience is based on thousands of installations of gas burning equipment in a wide variety of applications. Give us your problems. You will benefit from our experience.

The WEBSTER ENGINEERING CO.

Division of SURFACE COMBUSTION CORPORATION, Toledo, O.

Sales and Engineering Service in Principal Cities

P. G. and E. Makes 1935 Sales Presentation

RECENTLY distributed to the entire gas industry in Central and Northern California is an effective booklet produced by the Pacific Gas and Electric Co., outlining in detail its business development program for 1935.

The booklet reveals:

1. Appropriation of $1,750,000 by the P. G. and E. for sales promotion.

2. Summary of 1935 improved business conditions.

3. Basic income statistics for P. G. and E. territory.

4. Potential future market for appliances.

5. Outline of P. G. and E.'s comprehensive Sales-Service-Survey Plan for promotion of domestic, commercial, industrial and agricultural consumption, advertising appliance survey and market analysis, and cooperation with dealers, manufacturers and jobbers. (The Sales-Service-Survey program is covered on another page of this issue.)

The presentation also includes a well organized manual for participating appliance dealers, containing full information relating to cooperative selling activities for the year. The entire booklet is well designed in color, and is an effective piece of sales literature.

Some of the market information revealed in the P. G. and E. survey work referred to in the booklet is exceedingly impressive. It is estimated that the company is serving gas for use in 390,000 ranges, 195,156 automatic water heaters, 172,389 non-automatic water heaters, 90,189 central heating plants, 110,105 room heaters, and 1,104 refrigerators. This constitutes a tremendous replacement market.

Another large group of prospective appliance purchasers in the P. G. and E. area, made up of those who are now using other fuels, according to the survey consists of approximately 34,982 ranges, 35,152 water heaters, 16,733 central heating plants, 46,323 room heaters, and 56,163 fireplace appliances. In addition to the foregoing domestic prospects the company's survey files show approximately 15,000 commercial, industrial and agricultural prospects.

Summarizing, the replacement market for gas appliances is estimated at $67,200,000 and the potential new market for gas appliances at $10,500,000.

In the light of the market information developed the 1935 quotas for combined sales of dealers and gas company sales department are of interest. They include 25,200 ranges, 2,200 cookers, 13,750 automatic water heaters, 6,050 non-automatic water heaters, 700 radiators, 2,300 radiant heaters, 650 wall heaters, 4,500 floor furnaces, 9,800 circulators, 4,800 basement furnaces, 200 boilers, 1,000 large conversion burners, and 1,200 small conversion burners.

New Ranges Offered in Dallas "Oldest Ranges" Contest

The Dallas Gas Co., in cooperation with local appliance dealers in the nation-wide A.G.A. range sale, is offering five modern ranges to be given free, as a feature of the Dallas campaign, to the five women turning in the oldest ranges on the purchase of modern cooking appliances. So far during the campaign, some ranges turned in have dated back to the "gay nineties." Public interest in the campaign has been stimulated by cooperative advertising on the part of the Dallas Gas Co. which ties in local range dealers, and also in advertising by the dealers themselves featuring the A.G.A. approved appliances. For the purpose of the campaign, an all-modern gas range has been designated as one having the four following features: automatic top-lighter, insulated oven, oven-heat control, and drawer-type smokeless broiler. A range with these features must be purchased to make the housewife eligible to receive a new range free.

Andrew McCabe Dies April 6 Following Brother's Death

The death, April 6, of Andrew McCabe, 57, four years an employee of the Municipal Gas Co. of Hillsboro, Texas, followed by only eight days the death of his brother James B. McCabe, president of the Municipal Gas Co. at Dallas, reported in last month's issue. Death in both cases was due to heart attacks, the latest one being induced by grief and sorrow.

Wichita Falls Franchise Rescinded

A 20-year franchise to serve natural gas in Wichita Falls, Texas, granted the Wichita Falls Gas Co. in October, 1934, has been cancelled by the city council. The company failed to begin construction within the time designated.

BUILD YOUR HOUSEHEATING LOAD WITH KLIXON CONTROLS

These two advanced Klixon devices give exact automatic temperature control and assure positive pilot protection for your gas-fired space heaters . . . provide sales features that make it easy to sell gas heating.

Write today for descriptive bulletins.

SPENCER THERMOSTAT COMPANY
Unit of Metals & Controls Corporation
34 FOREST STREET • ATTLEBORO, MASSACHUSETTS

REFRACTORIES
GENERAL CERAMICS COMPANY
• REFRACTORIES •

For Conversion Burners, Circulating Heaters, etc.

Because they are uniformly accurate, strong, and dependable in every way, General Ceramics Refractories are used by most of the leading manufacturers of gas heating appliances. • Our engineers will gladly cooperate with you.

General Ceramics Company, 30 Rockefeller Plaza, New York

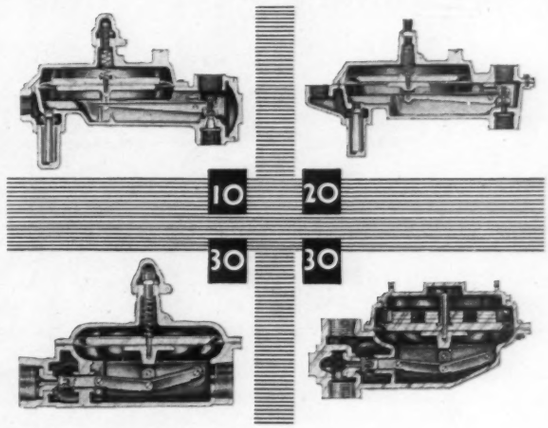
"MODERNIZE as you repair"

THE SPRAGUE METER COMPANY

BRIDGEPORT, CONN.

Los Angeles, Calif. San Francisco, Calif.

Davenport, Iowa. Houston, Texas.



RESULTS... are what determine successful Gas Control Performance

● Reynolds has more than forty years experience in the Gas Control Field, working out, designing, building, testing gas regulators, and the result: Hundreds of thousands of regulators in use throughout the world, meeting all requirements, giving successful performance.

The Service Regulators featured are built to meet the specific requirements in service regulation. They are guaranteed to give the high quality of performance you demand, over years of operation, with a minimum upkeep. Below are a few characteristics about the different models, 10, 20, and 30. (Model 30 is shown in Spring and Dead Weight Types).

MODEL 10—*Dead Weight or Spring Type,* with or without Mercury Seal, or Dead Weight Safety Seal. All working parts are so accessible as to be interchangeable without removal from pipe line.

MODEL 20—*Dead Weight or Spring Type,* with or without Mercury Seal, or Dead Weight Safety Seal. All working parts are so accurate as to permit complete interchangeability in shop.

MODEL 30—*For horizontal or vertical connections,* with or without removable valve pocket. Available with either Spring or Dead Weight adjustment. With or without Mercury or Dead Weight Safety Seal.

REYNOLDS BRANCH OFFICES:
421 Dwight Bldg., Kansas City, Mo.
2nd Unit, Santa Fe Bldg., Dallas, Tex.

REPRESENTATIVES:
Eastern Appliance Co., Boston, Mass.
F. E. Newberry, Avon, N. J.
G. H. Unekefer, 428 Boyd St., Los Angeles

Have you written for your copy of the Reynolds New Low Pressure and Appliance Regulator Catalog (Catalog L, Section 3)?

REYNOLDS GAS REGULATOR CO.

Anderson, Indiana, U.S.A.

GAS CONTROL SINCE 1892

Pipelining . . . Then and Now

(Continued from Page 33)

and flame, make it possible to deposit the weld metal with extreme rapidity. In this process the weld is made with only one bead on rolling, bellhole and tie-in welds and the same size rod is used for all welds.

A recent development which further speeds up the oxy-acetylene process is the use of a multi-flame welding head; one flame being used for the actual welding operations with two smaller flames being used for preheating the pipe ahead of welding. These two smaller flames bring the pipe walls to practically a molten stage requiring very little time for welding flame to fuse the rod into the vee.

In both processes care is taken to make all tie-in welds at times of minimum temperature. A strict inspection is made during welding operations and as a further check on the quality of the welding, coupons are cut from the line and tested for physical qualities. This procedure tends to maintain the quality of the welding at a high standard and eliminates to a great extent, the possibility of sacrificing welding quality for speed.

As previously mentioned, centering rings are an important factor in speeding up lining operations. Through the use of these centering rings the pipe is lined up in such a way there are no offsets between the joints and the spacing between the ends of the joints is uniform for the entire circumference of the pipe. With pipe lined up in this manner welding operations are materially assisted.

Two types of centering rings are used; the width of the ring is the same for both processes and varies from 2 to 3 inches depending on the design. The centering ring for the electric welding process has a bead about ⅛-inch in height and about 3/16-inch wide on the outside edge for the entire circumference of the ring. This bead assures proper spacing of the joints and is so designed as to permit proper penetration of the inner edge of the pipe wall. The ring used in the oxy-acetylene process has a groove approximately ¾-inch wide and ⅛-inch deep for the entire circumference of the ring. Spacing lugs are spotted on the ring to assure proper spacing of the pipe joints.

The use of large diameter pipe lines necessitated the development of different methods of laying the pipe in the ditch due to the fact that it was impossible to obtain the necessary slack in the line, which previously, with small diameter pipe lines, had been done, by snaking the line from one side of the ditch to the other. This necessary slack is now obtained by the use of slack loops.

The number of loops per mile is entirely dependent on the atmospheric temperature at the time of the lining, operating temperatures, and minimum ground temperatures. Here again power equipment is brought into play for lowering the line. A 60-horsepower caterpillar equipped with a side arm or a truck crane can be used advantageously for this work. Again this procedure contrasts very vividly with the older methods of using tripods and chain blocks for this purpose.

More efficient methods have been developed for the application of pipe protective materials. Much of the pipe, especially if a wrapped coating is used, is treated in a central location and hauled to the job. After welding and testing, the joints are then given the same treatment as was applied to the pipe. Field plants which can be moved along the line and set up in convenient locations from which to distribute the pipe along the right-of-way, are now being used. These plants are very efficient and have been developed for treating pipe up to 26-inch outside diameter. The developments for treating pipe have kept pace with the development of other pipe line operations in the demand for greater speed. Here again appears the marked contrast with older methods, under which the pipe material was applied to the pipe by hand over the trench.

All in all, pipelining is a vastly different operation than it was even so short a time as 10 years ago. In this field as in others, advances in materials and the technique of utilizing them have combined to set new standards, and have made possible the general extension of natural gas to markets far removed from sources of supply.

The ENSIGN
NATURAL GAS
with Automatic Fuel Regulator
CARBURETOR

Gives highest economy in fuel consumption per horse-power hour, together with easy starting and efficient engine performance. The fuel regulator assures precise fuel pressure and correct metering of gas at carburetor without waste or loss of power. Oil in gas will not impair valve action. Easy starting is assured without priming, even when hand cranking. Proved efficiency and economy in thousands of installations over a period of many years. Five sizes for either updraft or down-draft for all types of engines. Descriptive bulletin on request.

ENSIGN CARBURETOR COMPANY, LTD.
7010 So. Alameda St. P. O. Box 606, Huntington Park, Calif.

The Goodman Stopper

GOODMAN USED SINCE 1897 2" HANDLE & LOCKING SLEEVE GAS MAIN STOPPER

The Reliable Shut-off for Street Mains

Equipped with Improved Patented Locking Sleeve, which locks both handles to the pipe. Stopper cannot slip. Gas cannot pass.

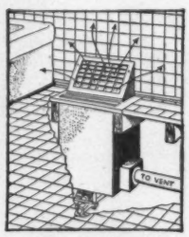
Safety Gas Main Stopper Co.
523 Atlantic Avenue, Brooklyn, N. Y.

Pac. Coast Rep.: C. B. Babcock Co.
135 Bluxome Street
San Francisco, California

NRA WE DO OUR PART

Patent Issued on Ward Wall-He-Tor No. 10

Patent No. 1997734 covering the Ward Wall-He-Tor No. 10 appliance has been issued to Raymond G. Logue, and assigned to the Ward Heater Co., Los Angeles, of which Mr. Logue is vice-president.



The appliance, illustrated at right, is a small combination floor and wall heater, designed primarily for bathroms, breakfast rooms and small bedrooms. It has 10,000 B.t.u. input and has been approved by the American Gas Association. The combustion chamber of the heater is hermetically sealed and all products of combustion are vented to the outside. The heater has two distinct and separate circulating systems; one-half of the heated air is taken from the room and one-half from the outside.

The appliance may be operated by pilot or manual control.

Carbide and Carbon Chemicals Corp. Completes Whiting, Ind. Plant

During March the new plant of the Carbide and Carbon Chemicals Corp. of New York placed its recently completed plant at Whiting, Ind., in operation. The plant occupies part of a 30-acre tract of land.

The corporation's manufacturing facilities at South Charleston, West Va., are also being enlarged.

Detroit Jewel and Garland Gas Ranges

. . . with their new styling; their beautiful, glistening chrome trim; the new, higher standard of construction . . .

The Garland Senior Model, the aristocrat of the kitchen, gives a new standard of supremacy in eye appeal and efficiency.

ARE BREAKING SALES RECORDS EVERYWHERE

The Detroit Jewel Junior Model develops both beauty and performance to a degree that makes it a gas range of unrivaled appeal.

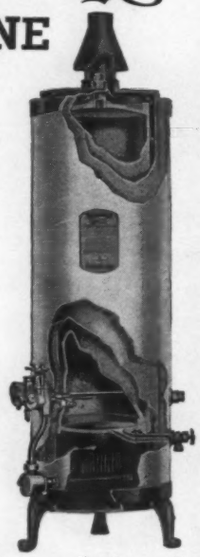
Since the presentation of the unexcelled 1935 Detroit Jewel and Garland Gas Ranges, they have been breaking sales records wherever displayed. Their outstanding, superior styling; the obvious quality throughout the construction of these ranges and the super worth of their many exclusive features have won instant approval of the buying public.

Gas companies all over the United States have found in these glistening, chrome trimmed models the answer to replacement sales. There is sound profit for you in their new standard of appearance and performance.

Sales history for this year is proving there is no substitute for quality and better styling in the gas range market. That is why 1935 Detroit Jewels and Garlands are breaking sales records everywhere.

DETROIT-MICHIGAN STOVE CO.

Detroit, Michigan

Welsbach
HOTZONE
Self-action storage gas water heaters

Approved by A. G. A. Laboratory
Heaters are made in all domestic sizes with 300 lb. test galvanized or Everdur tank.
Write for Details
WELSBACH COMPANY
Gloucester City, N. J.
SAN FRANCISCO, CALIF. CHICAGO, ILL.

FRASER
Radiant Front Console
Equipped with Fan

Velgrain Finish
The heater that smiles while it warms
Manufactured by
Fraser Furnace Company
Stockton, California
Distributed by
H. R. Basford Company
San Francisco Los Angeles

Those High Bill Complaints

(Continued from Page 48)

toward the company. Those who are apprehensive of the water heating expense may eventually seek to substitute some other water heating facility. Every opportunity should be taken, therefore, to keep the burner and pilot lights of heaters in proper adjustment. Where an accumulation of lime or other condition causes the cost per gallon of water heated to increase, recommendations as to corrective steps are in order.

Some types of water heaters are provided with temperature regulators which control the heat of the water. Customers' tastes in water temperatures differ and should be respected. High settings should be avoided unless the customer insists and even then the effect on consumption should be pointed out. Where old or defective heaters are in use the possible economies of newer and more efficient types can properly be discussed. Experience has shown that the cause of a great many high bill complaints is the amount of hot water used. Since the head of the house is not always informed on this matter it should always be carefully investigated and analyzed.

9. House Heating

The use of gas for house heating not only involves comparatively large consumptions but a usage which varies with weather conditions. By the time the customer receives the bill he may not remember that it covers a period of extremely cold weather. As high as 20 per cent of the total season's heating bill is normally used during a single winter month. Many heating customers are prone to assume that these large bills will continue and a complaint results. A valuable aid in handling house-heat complaints is to keep daily and monthly degree day charts which show the actual heat requirements for any period. Such tables are very helpful in settling complaints. Investigations of house heating bills will logically cover such items as temperature settings of thermostats, burner and pilot adjustments, insulation of premises, use of weather stripping and storm windows, frequency of opening and closing doors and other factors. Because of the importance of the load too much care and attention cannot be given complaints in this classification. Many companies delegate specially trained men to handle this work.

10. Ranges

Practically every gas customer has a range and in many homes it is the only gas consuming appliance. If its burners are not adjusted so as to give a proper flame some wastage of gas results. Although the range is the customer's property most regulatory bodies require operating gas companies to assume responsibility for keeping burners in proper adjustment on the theory that the gas sold is not a usable commodity until properly mixed with air and the customer is rarely in a position to know what air setting is proper. Accumulation of dirt around burners and ports causes trouble and preventable waste. Burner adjustments should be checked on every occasion of a visit to customer's premises.

Aside from burner adjustment the range is rarely responsible for bill complaints except where the customer uses wasteful tactics. Many customers appreciate economy suggestions and friends can be made by pointing out that bills may be reduced by: (1) Never allowing burner to be lighted until the utensil is ready, (2) avoiding the error of trying to do the impossible by heating water above the boiling point, (3) refrain from lighting oven too long a time before it will be needed. (4) turning out burners before removing vessel, (5) using the smallest burner suitable for the job, and (6) never allow gas flame to flare up around cooking utensils. It is true that such economies when placed in effect tend to reduce revenues somewhat but the revenue from wasted gas is generally dissipated in complaint handling and helpful suggestions make friends which are a big asset to the company.

11. Size of Family

The number of individuals in the householder's family group naturally has a bearing upon the amount of gas consumed. Families doubling up, extended visits of relatives, children home from school, and other variations in number of persons all affect the gas bill, to the customer's surprise, and must always be considered.

12. New Baby

Babies are good customers of the gas company. Supplemental heating, additional hot water, milk warming, between-meal food preparation, and greater use of laundry equipment result from the efforts to make the new arrival more comfortable. Of course, it is bad policy to bluntly blame the bill increase on the baby but many high bill complaints have been settled to the satisfaction of the householder by tactfully pointing out that the increase complained of is due to the new arrival. The proud parent will almost have to admit the baby's part of the bill is a good investment.

13. Household Help

In many instances the hired help, not being responsible for the payment of bills, are prone to waste gas. Due to habits previously contracted some servants are less economical than others in doing the same work. Laboratory tests have proved that two individuals rarely use exactly the same quantity of gas in performing identically the same cooking operation and the differences are sometimes surprising. Changes in the household personnel may be responsible for the bill increase and since this is correctible the possibility should always be carefully considered.

14. Roomers

Customers who rent out rooms relinquish some of their control over consumption of gas

The Pioneer Conversion Burner Still the Most Progressive—

Roberts-Gordon, we believe, built and installed one of the first automatically controlled conversion burners in the U. S. Since that pioneer day, we have constantly improved our product and our service. Today we act as a clearing-house for sales methods to aid the industry in making gas the preferred fuel for home heating.

Ask for Roberts-Gordon Air-Package Data Folder telling of the New Complete Winter Air-Conditioning Outfit at a Popular Price.

FOR EVERY HOME HEATING NEED

•

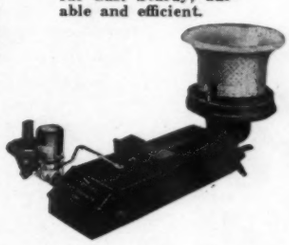
A Complete Line of Gas Conversion Burners for Home Heating. Gas-Fired Boilers. Complete Winter Air Conditioning

ROBERTS-GORDON APPLIANCE CORPORATION

Factory and Office: **Tonawanda and Arthur Streets**
Buffalo, New York
Sales Offices in Leading Cities

SERIES SR Rectangular Burner for use in Rectangular Boilers.

SERIES W Round Burner for Manufactured Gas used principally in Warm Air Fur Warm Air Furnaces.

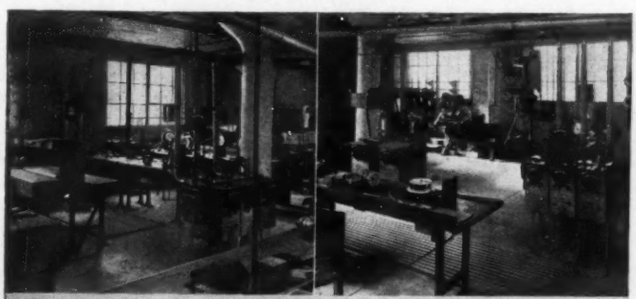


SERIES G Round Burner used principally on Natural Gas. Sturdy, durable and efficient.

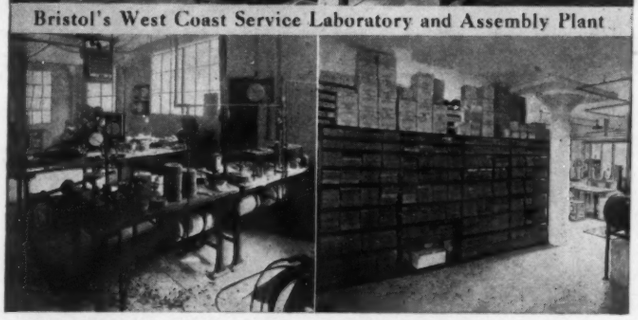
SERIES R Round Burner for Natural or Manufactured Gas—De Luxe Model.

Using Bristol's West Coast Service

saves your time and money



Bristol's West Coast Service Laboratory and Assembly Plant



When your recording instruments need re-calibration, re-conditioning or re-standardization, don't think of having this work done thousands of miles away. There is no need to. Ship them direct to Bristol's West Coast Service Laboratory and Assembly Plant in San Francisco—and save both time and money.

Pack gauges, thermometers, controllers, voltmeters, ammeters and other instruments carefully and send to 311 Minna St., San Francisco. Mail order authorizing work to nearest branch office.

THE BRISTOL COMPANY

Branch Offices: Rialto Bldg., San Francisco . . 747 Warehouse St., Los Angeles . . Branch Factory: 311 Minna Street, San Francisco.

BRISTOL'S

TRADE MARK REG. U.S. PAT. OFF.

PIONEERS IN PROCESS CONTROL SINCE 1889

Do You Know the Service Records of the NO-OX-ID Master Coat?

Do you know of the extra years of protection it is giving without maintenance cost? Do you know that this coat is adaptable to any type of soil or water? Complete data and estimates upon request.

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The NO-OX-ID MASTER COAT

MODERN EFFICIENT

Safe

Quick

Positive!

Pacific Forced Air Unit Heater *Illustrated*

PACIFIC'S *Complete* LINE of Gas Appliances Include:

- Floor Furnaces • Cabinet Heaters
- Wall Heaters • Gas Steam Radiators
- Radiant Heaters • Water Heaters
- Gravity Furnaces • Forced Air Furnaces • Unit Heaters

Write for complete information on any or all items

Pacific Gas Radiator Co.

Main Office and Factory

Huntington Park, California

Oldest and Largest Manufacturer of Gas Heating Appliances in the West

since it is practically impossible for them to regulate or even criticize the amount of hot water used by such tenants. This influence naturally is greater where rooms are let out for light housekeeping. There is little uniformity in the habits of roomers and many bill increases can be explained by the fact that the new roomer's requirements are greater than those of the previous occupants of the same quarters.

15. Entertaining

In entertaining guests more gas is generally used. It often happens that by the time a bill is received the customer has forgotten that functions were held or visitors entertained. Carefully worded inquiries regarding entertaining during the billing period in question will sometimes explain bill increases.

16. Sickness

When the misfortune of sickness visits a home an increase in gas usage usually results. When information is available regarding extended illness in the family it can sometimes be referred to in discussing the possible causes of increase.

17. Seasonal Increases

Analysis of customers' bills shows that seasonal variations are not uncommon. Curiously enough some classes of customers' bills increase in winter while others increase in summer. Winter increases may be due to the use of gas in connection with the heating system. More gas is necessary to bring cold water to the required temperature. The tendency is to cook more and heavier foods during the winter season. Offsetting this is the fact that many customers satisfy their hot water requirements in the winter with furnace coils. Customers whose bills increase in the summer are those who heat water with gas only in the summer months or who do all of their cooking with gas in the summer months but use a combination range in colder weather in order to heat the kitchen.

18. Billing Errors

Although gas companies take precautions to avoid errors in computing bills the possibility of such errors should never be overlooked. It is a good plan to have customers check the accuracy of their bills with you since this will help convince them that the computations are correct and will also teach them how gas bills are figured.

19. The Billing Period

Bill increases are frequently explained by the fact that the period covered is longer than the normal billing period. It should be borne in mind that where the period is only three days longer than a normal month the consumption would be 10 per cent higher with uniform usage. The number of days covered by the bill in question is one of the first things to check in any bill investigation.

20. Neighbor's Bills

"My bills are higher than my neighbors" is frequently heard at the gas company complaint desk. Experience has proved that there is so little uniformity in the habits of families that such comparisons mean nothing. Even where the number of persons and the appliances used are the same the gas requirements of one group may be double that of another. One method of answering such complaints is to explain carefully that the gas company places an unlimited supply of gas at the disposal of each customer. The amount they draw from this supply is controlled entirely by them. No gas will be registered by their meter except when a gas utilizing appliance is in operation. The gas meter merely counts up the number of units of gaseous fuel which the customer elects to withdraw from the company's supply. By emphasizing the fact that the sole control of the amount used is vested in the customer and the members of his household the complainant is brought to see that the blame cannot fairly be placed on the company.

Complaint men will realize that a lot of time would be required to fully investigate each of the possibilities listed above. It goes without saying that in no instance will it be necessary to interrogate the customer concerning each and every item set forth. It would be well, however, for complaint handlers to keep all of them constantly in mind so as to avoid overlooking any single item since the overlooked item might be the answer to the increase. Having plausibly explained the cause of the higher billing it is much easier to close the complaint to the customer's satisfaction. Complaint men who are open minded and honestly anxious to locate and correct the cause of the customer's dissatisfaction can do much to build good-will and improve the company's reputation.

H. C. Erhard, Made General Sales Manager of Standard Gas Equip. Corp.

Announcement is made by the Standard Gas Equipment Corp. of the appointment of Herbert C. Erhard as general sales manager of the company. He succeeds J. F. Donovan, who recently resigned to become affiliated with the gas merchandising division of Williams & Saylor, Inc., New York merchandising and advertising counsellors.

Mr. Erhard, who has been assistant general sales manager of the Standard Gas Equipment Corp. during the past four years, has a long record of service with the company. He originally became connected with the former William M. Crane Co. in 1915. After this company and others were consolidated in 1926 to form the Standard Gas Equipment Corp., Mr. Erhard spent two years as a special headquarters representative in the metropolitan area, after which he was appointed assistant to the sales manager of the Vulcan division. In 1931 he was made assistant general sales manager.

PUBLISHER'S STATEMENT OF CIRCULATION

This is to certify that the average circulation per issue of *Western Gas* for the six months period July 1st to and including December 31st, 1934, was as follows: Copies sold 2862; Copies distributed free 277; **Total 3139** *per issue.*

(Signed) JAY JENKINS, Publisher.

Subscribed to and sworn before me on this 22nd day of January, 1935.

JOSEPHINE C. WHITING, Notary Public.

(Notary's Seal).

DIRECTORY

Byllesby Engineering and Management Corporation

Wholly-owned subsidiary of Standard Gas and Electric Company

231 South La Salle Street, Chicago
New York Pittsburgh San Francisco

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MODERN HORIZONTAL BORING MACHINE

For Underground Installation of Pipe and Conduits. Avoids damage to costly pavements and saves time. Send for Bulletin.

HYDRAUGER CORPORATION, Ltd.
116 New Montgomery St. • San Francisco, California

SMITH-EMERY CO.

CHEMISTS — ENGINEERS — INSPECTORS
Technical service for gas producer and distributor, appliance manufacturer and dealer
920 Santee Street Los Angeles, Calif.

Handbook of Butane-Propane Gases

(Second Edition)

See Page 71 for detailed contents and handy coupon.

FREDELL • CONSTRUCTION COMPANY

Builders of oil and gas pipe lines

In the past four years we have built more than 3,000 miles of oil and gas pipe lines in the states of Minnesota, South Dakota, Nebraska, Iowa, Kansas, Oklahoma, Texas, New Mexico and Colorado. Lines included 10-inch, 12-inch, 14-inch, 16-inch, 18-inch and 24-inch sizes, with the major mileage consisting of the larger diameters.

O. J. FREDELL - - - - *President*
A. J. HARDENDORF - - *Vice-President*

604 FANNIN BLDG. Houston . . . . Texas
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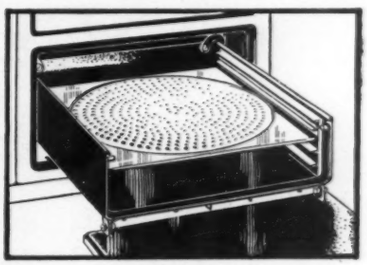
WEDGEWOOD'S NEW COOKING PRINCIPLES!

Patented ASTOGRIL BROILER



This latest type broiler consists of a thick cast aluminum grill and circular reservoir within a roller-bearing mounted pull-out drawer. The grill is preheated and sears on both sides simultaneously to seal in juices and improve flavors. It broils small pieces like oysters, bacon, vegetables, etc. that would fall through a grated type broiler. It is convenient to use and very easy to clean. Makes broiling the better and healthier way of cooking.

SPEED *plus* SIMMER BURNERS

A 2-in-1 aluminum burner operated by a single gas valve. The entire burner or the simmer flames can be used alone as desired. Without using special utensils the simmer flames make waterless or semi-waterless cooking possible on every top burner! This method of cooking is healthier, tastier, more convenient. Avoids excessive steam and odors in the kitchen—pots do not boil dry or scorch. Descriptive folder mailed on request.

JAS. GRAHAM MFG. CO.
San Francisco, Los Angeles and Newark, Calif. • Portland, Oregon

OVER 1,000,000 SATISFIED USERS IN THE WEST

Bottled Gas in France

(Continued from Page 69)

The regulators used are rather small (2-inch diameter) and of very simple design. They resemble closely the small type regulators used in the U. S. for demonstrating purposes. No pigtails are used for connecting the regulators with the cylinders; they are screwed on directly to the valves by means of a union coupling.

FIG. 3. European type cylinder after bursting test. Note that break occurred outside of weld.

FIG. 4. Bottling plant (in foreground) at a French refinery.

The performance of these small regulators is of course much inferior to standard American 6-inch regulators. While the pressure maintained for small flow may be fairly constant, the differential between shut-off and flow pressure is very high—up to 50 per cent and more. (American practice is 10 per cent.)

No fuse plugs or safety valves are used with the above type cylinders. Apparently, the eventuality of a fire in which the cylinders would be involved has not been taken into consideration.

It is imperative—although frequently neglected—to shut off the cylinder valve when the appliance is turned off. Since there is no safety valve to stop building up excessive pressure in the distributing line, a small leak of the regulator is likely to blow off the rubber hose, used frequently in connecting the appliance to the regulator.

A French refinery started some time ago to market butane obtained from its cracked gas. The cylinders used by that company are more substantially built and are tested at 375 pounds. The bursting pressure is nearly 1200 pounds. (See Fig. 3.) Valves and regulators are of American manufacture.

When the distribution of bottled gas in France was started three years ago, the product was imported from the U. S. and was composed chiefly of casing-head gas butane. Since then several French refineries have installed recovery plants and fractionators to manufacture liquefied petroleum gas from refinery vapors and cracked gases. A mixture of the light hydrocarbons is obtained by compression or absorption and fractionated in high pressure stabilizers. The bottling of the product is usually done at the refinery itself. Fig. 4 shows the bottling plant installed in a French refinery.

The cylinders are shipped by truck or by freight to distributors, who handle the product in their territories and sell it through local agents, usually plumbers or hardware stores. The distributor gets about 20 per cent of the gross sales receipts.

Appliances for bottled gas are of conventional design, most of them having been adapted from coal gas models. The efficiency of a good stove or range is between 45 and 55 per cent. Concealed manifolds, moulded cocks and attractive enameling are favored by the public.

MEDDLER-PROOF

FULTON Spring Type Regulator

LIGHT, compact, and easily transported, yet sturdy, dependable, and durable in hard use, the Fulton Spring Type Regulator is recommended for exposed and remote locations. It is self-protecting to an uncommon degree—less subject to accidental disturbance or even intentional meddling than a lever-type regulator—and is very simply designed for quick connection. The high-pressure type will take any inlet pressure up to 300 pounds and reduce to a constant pressure anywhere between 10 and 50 pounds, as desired. Low pressure type is adapted for inlet pressures up to 50 pounds and will reduce to desired pressure not exceeding one pound. Full information on this and other C-F regulators for all requirements of gas control will be mailed on request.

The Chaplin-Fulton Mfg. Company

28-40 Penn Avenue **Pittsburgh, Pa.**

REPRESENTATIVES

WESTCOTT & GREIS, Inc.
Sales and Service
Dallas — Tulsa

JNO. W. CRAWFORD
Sales Engineer
1855 Industrial Street, Los Angeles

PARSONS ENGINEERING CO.
Los Angeles, Calif. San Francisco, Calif.

OR ANY JOBBER

Largest Sugar Refinery Turns From Oil Fuel to Gas

The plant of the California Hawaiian Sugar Refining Corp., Ltd., at Crockett, Calif., the largest sugar refining unit in the world, is now using natural gas for all fuel operations, including the char house and large steam boiler plant. Conversion from oil fuel was made early this year with the extension of a gas service line to the plant by the Coast Industrial Gas Co.

MAGIC CHEF SERIES 1400

A Real Advance in Gas Range Design

JUST as the first Magic Chef created a sensation in the industry and gave gas cookery a great forward movement, so does Magic Chef Series 1400 set up a new standard of advanced gas range design and modern cooking efficiency.

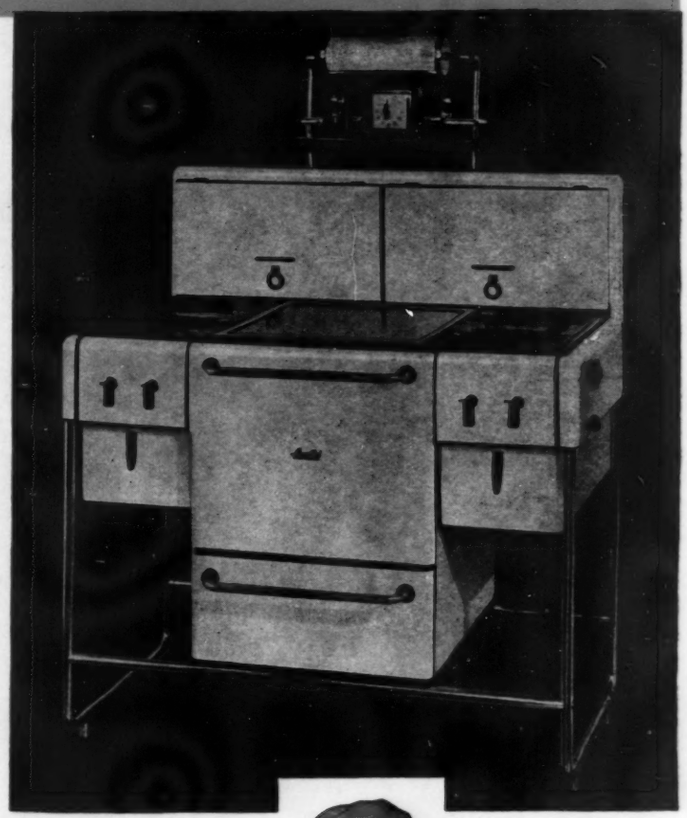
Everywhere dealers are praising it. Everywhere it is causing consumers to stop, look, ask questions, exclaim in admiration—and *buy*.

The streamline beauty of Magic Chef Series 1400, its tubular steel frame, its modern door handles, and condiment shelf support of chrome finish tubular steel, its convenient divided cooking top illuminated with a shaded lamp, its appealing modern design, give it eye-appeal and sales-compelling value not approached by any other cooking appliance.

As an aid to Magic Chef retailers, it provides convincing proof to the housewife that if she doesn't get a Magic Chef gas range, she doesn't get all that modernized cookery can give her.

For gas companies, it provides another potent weapon in combatting electric competition and adds greater force to the fact that "Gas is the modern fuel."

If you haven't already done so, lose no time in ordering a sample Magic Chef Series 1400 for display on your sales floor.



LOOK FOR THE RED WHEEL

WHEN YOU BUY A MAGIC CHEF

Magic Chef

AMERICAN STOVE COMPANY

AMERICAN STOVE COMPANY

World's Largest Manufacturer of Gas Ranges

BOSTON • NEW YORK • ATLANTA • CLEVELAND • CHICAGO
ST. LOUIS • PHILADELPHIA • SAN FRANCISCO • LOS ANGELES

MECOSTA

A mile a day

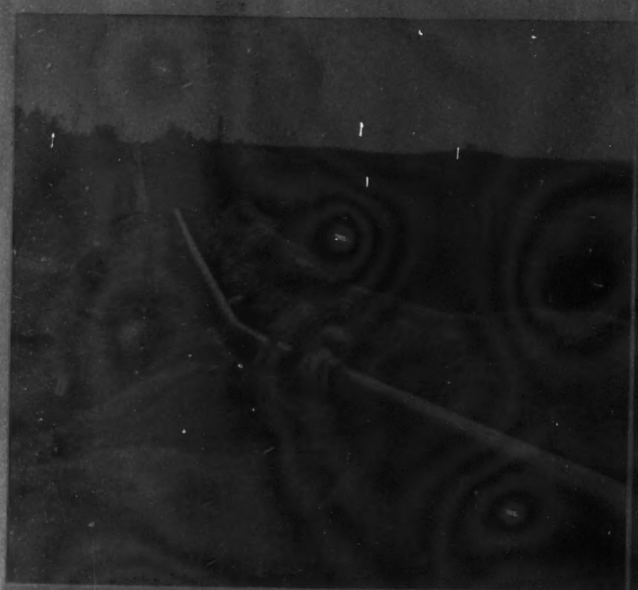
with

REPUBLIC ELECTRIC WELD LINE PIPE IN MICHIGAN

ON September 17, 1934, actual construction was started on a new 8-inch welded pipe line to carry gas from the Austin Field, Mecosta County, to Muskegon, Michigan. The line was laid at the rate of a mile a day until the 55 miles were completed, despite the difficulties. Swampy and boggy soil were encountered. Rotten stumps had to be pulled out with tractor and winch. And two 6-inch lines had to be buried three feet below the bed of the Little Muskegon River to provide a crossing for the line near Croton. Yet 550 men with the aid of Republic Electric Weld Pipe completed the work on schedule.

Republic Electric Weld Line Pipe saves time and construction expense on long and short lines—because it is round—because it is uniform in diameter and wall thickness—because it can be made in long lengths—because it is easy to bend and weld—and because its electric resistance weld is 100% free from defects. It is available in sizes up to 16-inch O. D., and can be produced fast enough to meet any pipe line schedule.

Let us send you complete information on this better pipe.



REPUBLIC STEEL CORPORATION

GENERAL OFFICES — YOUNGSTOWN, OHIO

REPUBLIC
ELECTRIC WELD
LINE PIPE